Radio Test Report

Report No.:STS2505036W08

Issued for

Sound Devices, LLC

E7556 State Road 23 and 33, Reedsburg, WI 53959, United States Of America

Product Name:	Professional Handheld Wireless Microphone
Brand Name:	N/A
Model Name:	ASTRAL HH
Series Model(s):	N/A
FCC ID:	2AKLX-28297
Test Standards:	FCC Part 74 Rules

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Shenzhen STS Test Services Co., Ltd.

TEST REPORT

Applicant's Name .....: Sound Devices, LLC

Address.....: E7556 State Road 23 and 33, Reedsburg, WI 53959, United States Of America

Manufacturer's Name.....: Sound Devices, LLC

Address.....: E7556 State Road 23 and 33, Reedsburg, WI 53959, United States Of America

Product Description

Product Name.....: Professional Handheld Wireless Microphone

Brand Name .....: N/A

Model Name.....: ASTRAL HH

Series Model.....: N/A

Test Standards .....: FCC Part 74 Rules

Test Procedure.....: ANSI C63.10-2020; C63.26-2015

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Shenzhen STS Test Services Co., Ltd.

Date of Test ..... :

Date of receipt of test item ..... : 09 May 2025

Date of performance of tests..... : 09 May 2025~17 Sept. 2025

Date of Issue ..... : 17 Sept. 2025

Test Result..... : Pass

Testing Engineer : Aaron Bu

(Aaron Bu)

Technical Manager : Skylar. Li

(Skylar Li)

Authorized Signatory : Bovey Yang

(Bovey Yang)

SHENZHEN STS TEST SERVICES CO., LTD. TESTING APPROVAL

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Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	17 Sept. 2025	STS2505036W08	ALL	Initial Issue

101, Building B, Zhuoke Science Park, No. 190 Chongqing Road, Zhancheng Shequ, Fuhai Sub-District, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 3688 6288 Fax: +86-755 3688 6277 Http://www.stsapp.com E-mail:sts@stsapp.com

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:
The EUT has been tested according to FCC CFR 47:
Part 2: Frequency Allocations and Radio Treaty Matters: General Rules and Regulations (10-1-05 Edition)
Part 74: Experimental Radio, Auxiliary, Special Broadcast and other program distributional services

Emission			
Standard	Item	Limit	Result
FCC 2.1053; 74.861(e)(6)	Radiated Spurious Emission	Refer to 74.861e(6)	PASS
FCC 2.1046 (a), 74.861(e)(1)	RF Output Power	250 mW	PASS
FCC 2.1047 (b), 74.861(e)(3)	Modulation Deviation	Refer to 74.861e(2)	N/A
FCC 2.1047 (a)	Audio Frequency Response	Refer to 2.1047(a)	N/A
FCC 74.861 (e)(5)	Occupied Bandwidth	< 200 KHz	PASS
FCC 74.861 (e)(6)(i) (ii); FCC 2.1049	Emission Mask	Refer to 74.861e(6)	PASS
2.1055(b); 74.861 e(4)	Frequency Stability vs. Temperature	Refer to 74.861e(4)	PASS
2.1055(a)(1); 74.861 e(4)	Frequency Stability vs. Voltage	Refer to 74.861e(4)	PASS
FCC 15.207	Line Conducted Emissions	Refer to 15.207	PASS

Note:
(1) “N/A” denotes test is not applicable in this Test Report.

1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

Add. :101, Building B, Zhuoke Science Park, No.190 Chongqing Road, ZhanChengShequ, Fuhai Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.755dB
2	Unwanted Emissions, conducted	±2.874dB
3	All emissions, radiated 9K-30MHz	±3.80dB
4	All emissions, radiated 30M-1GHz	±4.18dB
5	All emissions, radiated 1G-6GHz	±4.90dB
6	All emissions, radiated>6G	±5.24dB
7	Conducted Emission (9KHz-150KHz)	±2.19dB
8	Conducted Emission (150KHz-30MHz)	±2.53dB
9	Occupied Channel Bandwidth	±3.5%
10	Duty Cycle	±3.2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name:	Professional Handheld Wireless Microphone
Brand Name:	N/A
Model Name:	ASTRAL HH
Series Model :	N/A
Model Difference description:	N/A
Operation Frequency Range	956.45MHz - 959.85Mz
Modulation mode / type:	Digital modulation
Temperature Range:	-10 °C ~ +40 °C
Test frequency list:	See Note 4.
Power Rating	N/A
Adapter	N/A
Battery	Rated Voltage: DC 3.7V Charge Limit Voltage: DC 4.2V Capacity: 4000mAh
Software version number:	N/A
Hardware version number:	N/A

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.
2. 956.45 MHz -959.85 MHz

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	956.550	2	956.575	3	956.6	4	956.625
……	……	65	958.15	……	……	……	……
126	959.675	127	959.700	128	959.725	129	959.750

3. Table for Filed Antenna

956.45 MHz -959.85 MHz

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
1	Sound Devices	ASTRAL HH	Integrated Antenna	N/A	2.11	Antenna

The EUT antenna is Integrated Antenna. no antenna other than that furnished by the responsible party shall be used with the device.

4. Test frequency list

956.45 MHz -959.85 MHz		
Test Channel	EUT Channel	Test Frequency (MHz)
lowest	CH01	956.55
middle	CH65	958.15
highest	CH129	959.75

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test,please see the above listed frequency for testing.

2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively .

Pretest Mode	Description
Mode 1	Low Channel
Mode 2	Middle Channel
Mode 3	High Channel
Mode 4	AC Charging
Mode 5	2.4G + Microphone
Mode 6	BLE + Microphone

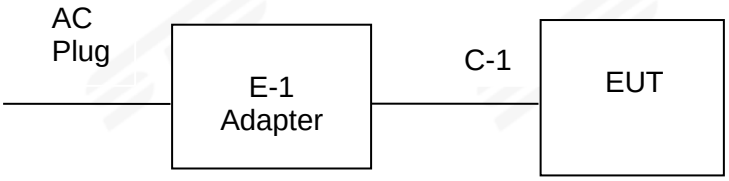
Note:

(1) Due to the different configuration and test, in this list only some worse mode. The worst test data of the worse modeis reported by this report.

2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

R diated Spurious Emission Test

AC Conducted Emission Test



RF Conducted Emission Test

2.4 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Note
E-1	Adapter	ZTC	NB-A515A	N/A
C-1	USB Cable	N/A	*TTL-232R-3V3*	*N/A*

Item	Shielded Type	Ferrite Core	Length	Note
C-1	Shielded	NO	100cm	N/A

Note:

(1) For detachable type I/O cable should be specified the length in cm in『Length』column.
(2) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.5 TEST EQUIPMENT

RF Radiation Test Equipment					
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Temperature & Humidity	SW-108	SuWei	N/A	2025.02.24	2026.02.23
Wireless Communications Test Set	R&S	CMW 500	117239	2024.09.23	2025.09.22
Pre-Amplifier(0.1M-3GHz)	EM	EM330	060665	2025.02.22	2026.02.21
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2024.09.23	2025.09.22
Pre-Amplifier(18G-40GHz)	SKET	LNPA_1840-50	SK2018101801	2025.02.22	2026.02.21
Positioning Controller	MF	MF-7802	MF-780208587	N/A	N/A
Signal Analyzer	R&S	FSV 40-N	101823	2024.09.23	2025.09.22
Switch Control Box	N/A	N/A	N/A	N/A	N/A
Filter Box	BALUN Technology	SU319E	BL-SZ1530051	N/A	N/A
Video Controller	SKET	FCS C-3	N/A	N/A	N/A
Bilog Antenna	TESEQ	CBL6111D	34678	2024.09.30	2025.09.29
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2024.09.25	2025.09.24
Horn Antenna	A-INFOMW	LB-180400-KF	J211020657	2023.10.10	2025.10.09
Antenna Mast	MF	MFA-440H	N/A	N/A	N/A
Turn Table	MF	N/A	N/A	N/A	N/A
AC Power Source	APC	KDF-11010G	F214050035	N/A	N/A
DC Power Supply	Zhaoxin	RXN 605D	20R605D11010081	N/A	N/A
Test SW	EMC Test Software	15.2.0.339			
AC Connected Test Equipment					
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Test Receiver	R&S	ESCI	101427	2024.09.24	2025.09.23
Limtter	CYBERTEK	EM5010	N/A	2024.09.24	2025.09.23
LISN	R&S	ENV216	101242	2024.09.24	2025.09.23
LISN	EMCO	3810/2NM	23625	2024.09.24	2025.09.23
Temperature & Humidity	SW-108	SuWei	N/A	2025.02.24	2026.02.23
Test SW	EZ-EMC	Ver.STSLAB-03A1 CE			
RF Connected Test Equipment					
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Temperature & Humidity	SW-108	SuWei	N/A	2025.02.24	2026.02.23
Universal Radio communication tester	R&S	CMU200	119907	2025.02.22	2026.02.21
Signal Generator	Agilent	N5182A	MY46240556	2024.09.23	2025.09.22
Signal Analyzer	Agilent	N9020A	MY52440124	2025.02.22	2026.02.21
Temperature & Humidity Test Chamber	Safety test	AG80L	171200018	2025.02.22	2026.02.21
Programmable Power Supply	Agilent	E3642A	MY40002025	2024.09.23	2025.09.22
Attenuator	HP	8494B	DC-18G	2025.02.25	2026.02.24
AC Power Source	APC	KDF-11010G	F214050035	N/A	N/A

3. TEST METHODOLOGY

3.1 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirement in Section 13.1.4.1 of ANSI C63.4:2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Not Applicable (Since the EUT is powered by battery)

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4:2003.

3.2 DESCRIPTION OF TEST MODES

The EUT has been tested under engineering test mode condition and the EUT staying in continuous transmitting mode.

3.3 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

4. FCC PART 74 REQUIREMENTS

4.1 CONDUCTED EMISSION MEASUREMENT

POWER LINE CONDUCTED EMISSION LIMITS

The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

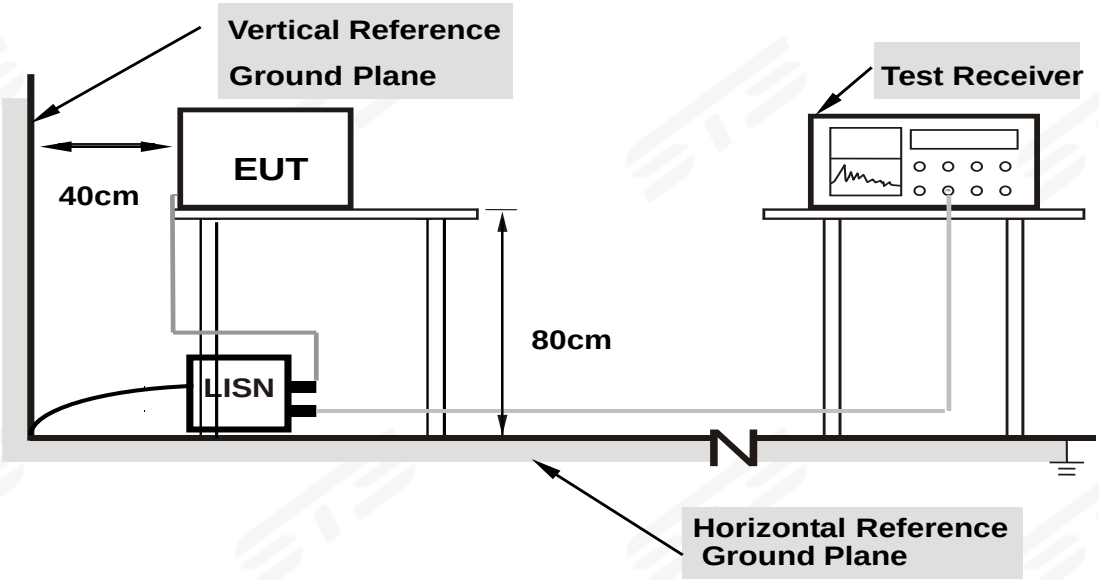
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

4.1.1 TEST PROCEDURE

a. The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN is at least 80 cm from the nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.2 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support units.

4.1.3 EUT OPERATING CONDITIONS

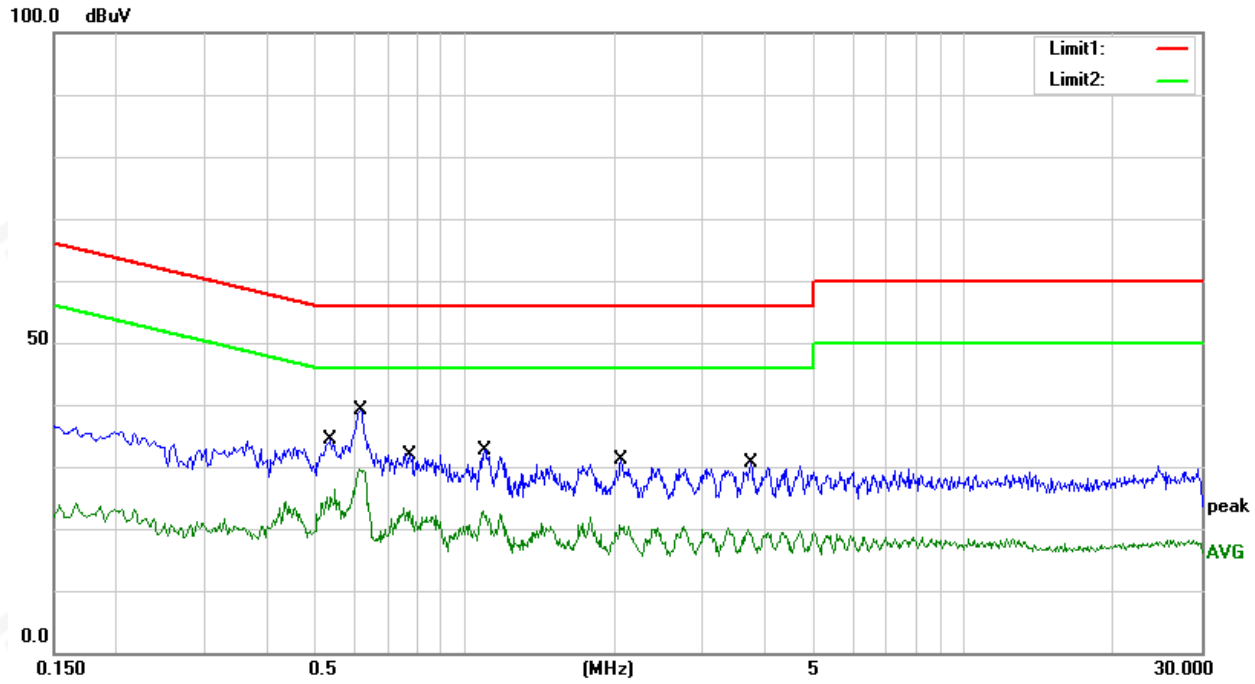
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

4.1.4 TEST RESULT

Temperature:	25.1℃	Relative Humidity:	59%
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 4		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.5380	14.34	19.97	34.31	56.00	-21.69	QP
2	0.5380	5.23	19.97	25.20	46.00	-20.80	AVG
3	0.6180	19.19	19.90	39.09	56.00	-16.91	QP
4	0.6180	9.80	19.90	29.70	46.00	-16.30	AVG
5	0.7780	12.10	19.81	31.91	56.00	-24.09	QP
6	0.7780	3.55	19.81	23.36	46.00	-22.64	AVG
7	1.0980	12.82	19.77	32.59	56.00	-23.41	QP
8	1.0980	3.09	19.77	22.86	46.00	-23.14	AVG
9	2.0580	11.46	19.79	31.25	56.00	-24.75	QP
10	2.0580	2.14	19.79	21.93	46.00	-24.07	AVG
11	3.7500	10.73	19.84	30.57	56.00	-25.43	QP
12	3.7500	0.21	19.84	20.05	46.00	-25.95	AVG

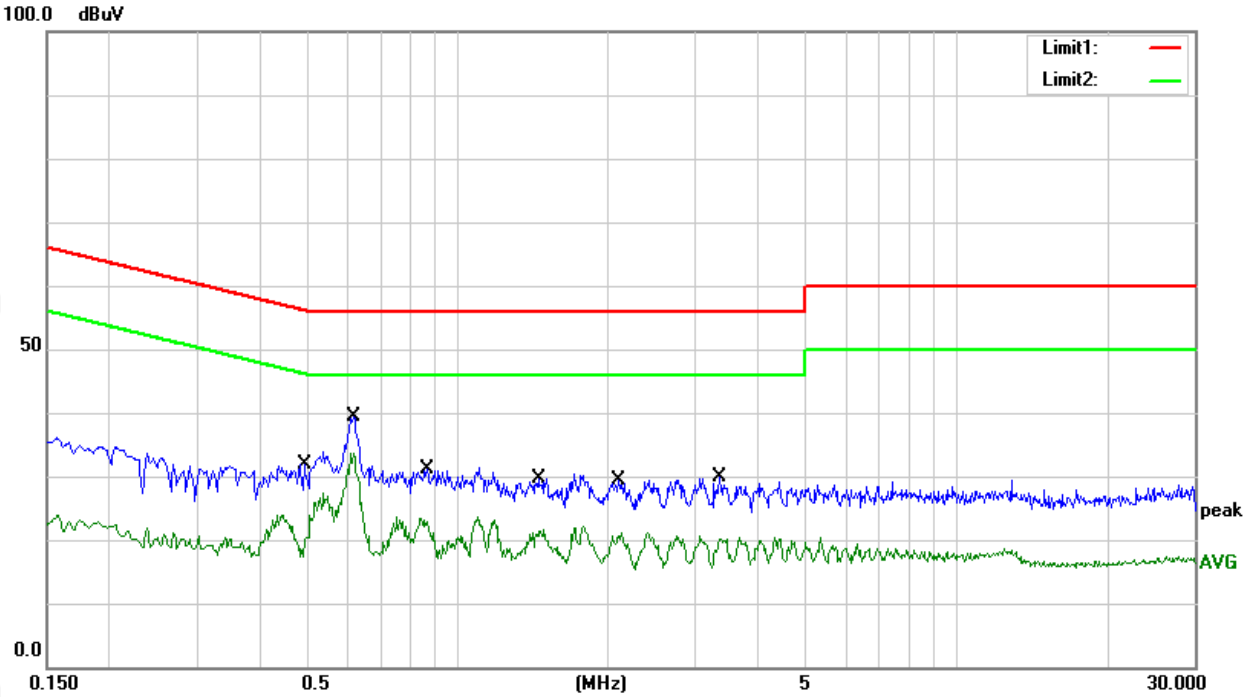
Remark:
1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



Temperature:	25.1℃	Relative Humidity:	59%
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 4		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.4940	11.86	19.96	31.82	56.10	-24.28	QP
2	0.4940	7.30	19.96	27.26	46.10	-18.84	AVG
3	0.6180	19.59	19.89	39.48	56.00	-16.52	QP
4	0.6180	13.64	19.89	33.53	46.00	-12.47	AVG
5	0.8700	11.45	19.80	31.25	56.00	-24.75	QP
6	0.8700	3.51	19.80	23.31	46.00	-22.69	AVG
7	1.4500	9.91	19.82	29.73	56.00	-26.27	QP
8	1.4500	3.27	19.82	23.09	46.00	-22.91	AVG
9	2.1100	9.40	19.88	29.28	56.00	-26.72	QP
10	2.1100	2.32	19.88	22.20	46.00	-23.80	AVG
11	3.3580	10.01	19.94	29.95	56.00	-26.05	QP
12	3.3580	0.80	19.94	20.74	46.00	-25.26	AVG

Remark:
1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



4.2 RADIATED SPURIOUS EMISSION

4.2.1 TEST LIMITS

According to CFR 47 section 74.861 e (6)(iii), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.
It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

= P(dBW) - [43 + 10log(P)] (dB)

= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

= -13dBm.

4.3 EMISSION MASK I

TEST LIMITS

a. - According to CFR 47 section 74.861 e (6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:
(1) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;
(2) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;
(3) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43+10log 10 *(mean output power in watts) dB;

4.4 EMISSION MASK II

TEST LIMITS

- According to ETSI EN 300 422-1 V2.2.1 Clause 4.2.4,
The transmitter output spectrum shall be within the mask defined in figure 2 where B is the declared channel bandwidth

a.

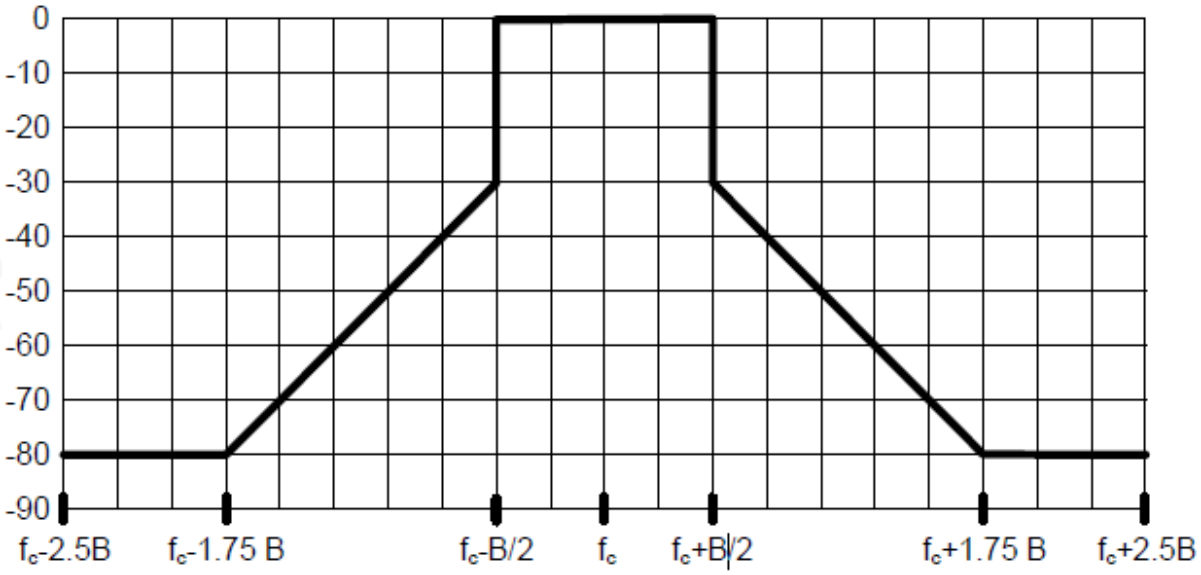


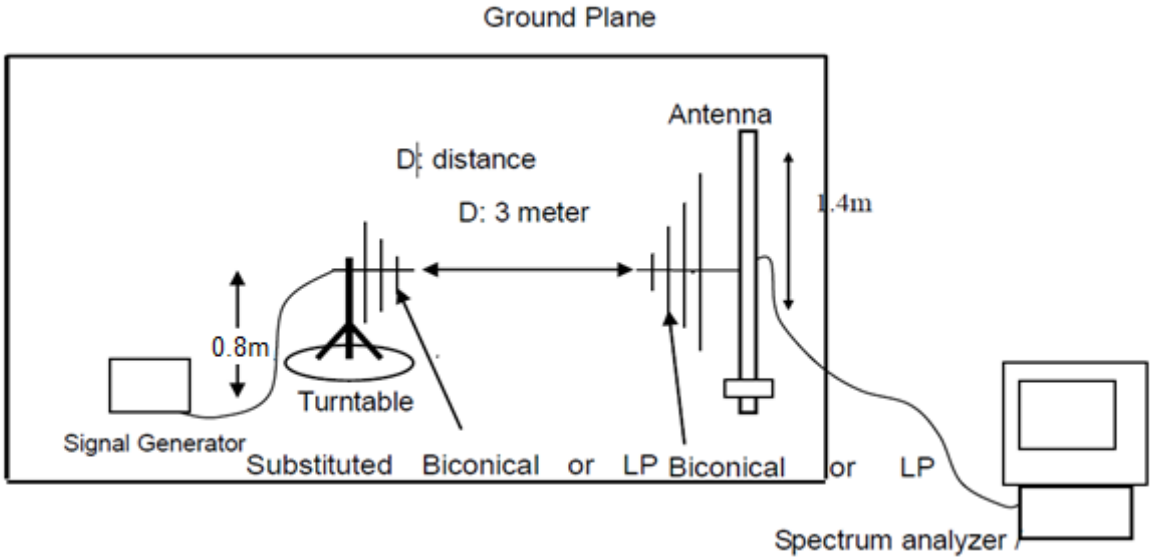
Figure 2: Transmit spectral power mask for equipment employing digital modulation, except WMAS, RBW = 1 kHz

TEST PROCEDURE

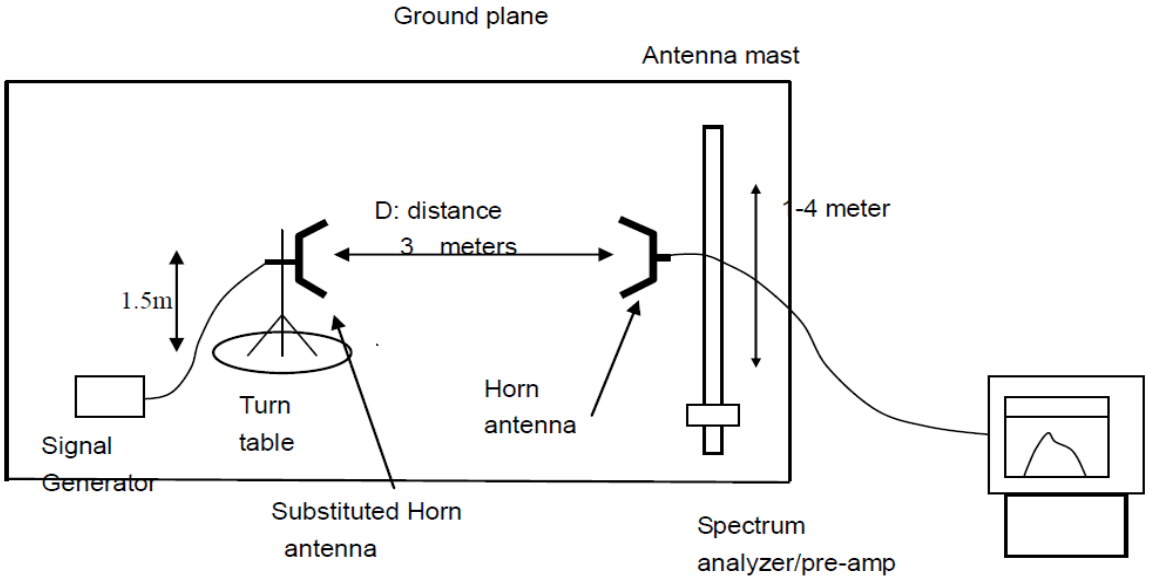
a. On a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.
b. The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
c. The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
d. The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
e. The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
f. The transmitter shall than be rotated through 360°in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
g The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
h The maximum signal level detected by the measuring receiver shall be noted.
i The measurement shall be repeated with the test antenna set to horizontal polarization.
j Replace the antenna with a proper Antenna (substitution antenna).
k The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
l The substitution antenna shall be connected to a calibrated signal generator.
m If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
n The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
o The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
p The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
q The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

TEST CONFIGURATION

（A）Radiated Emission Test-Up Frequency Above 30MHz



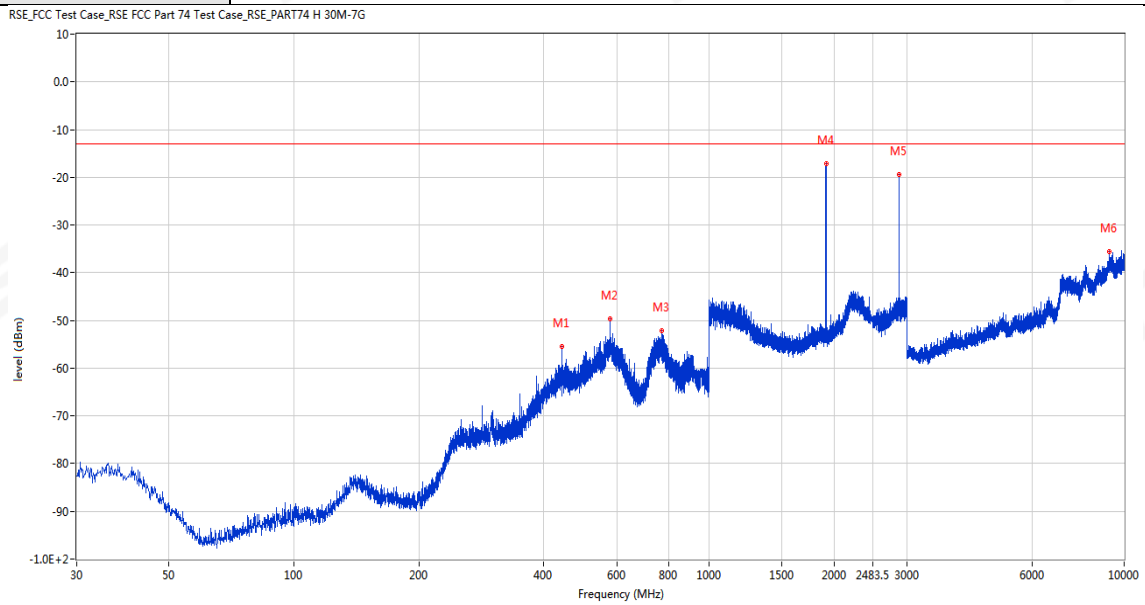
（B）Radiated Emission Test-Up Frequency Above 1GHz



（C）Conducted Emission Test Set-Up

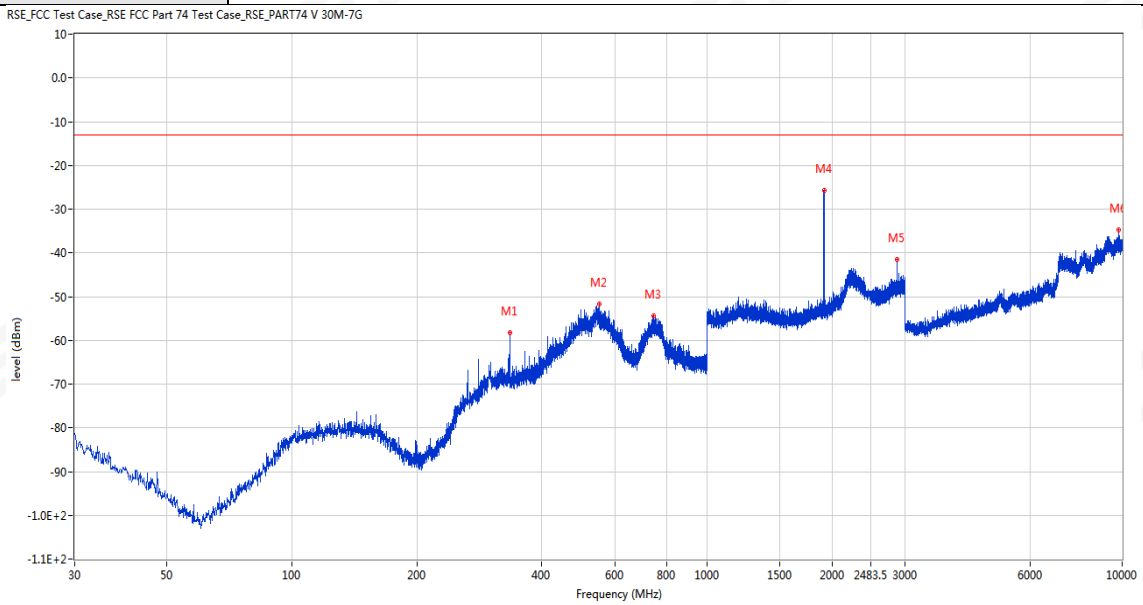
TEST RESULTS

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 1		



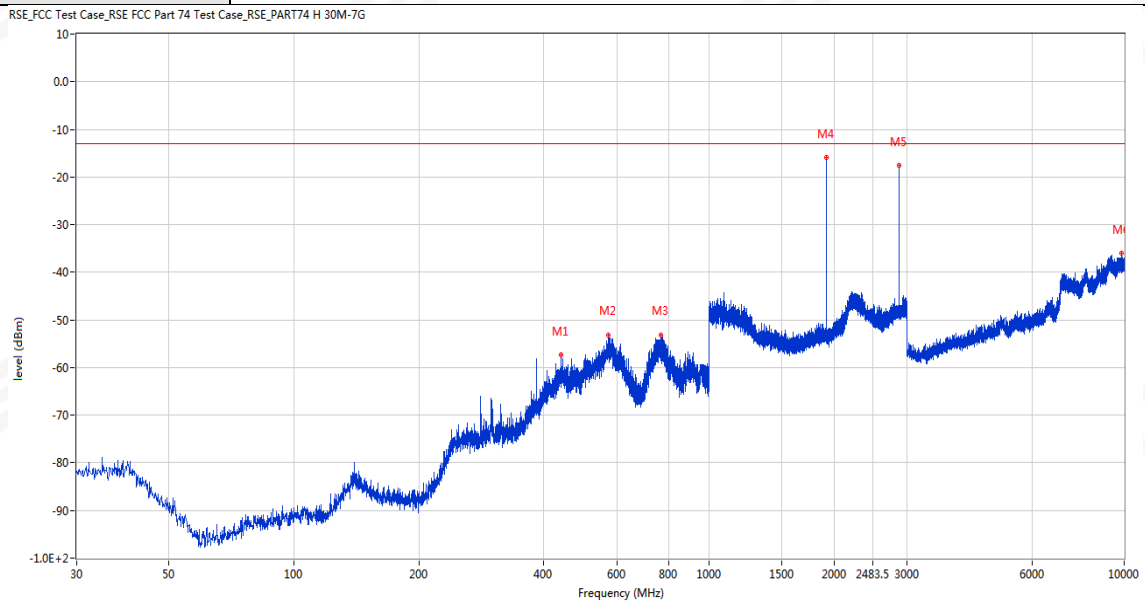
Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
442.856	-55.56	3.16	-13.0	42.56	267.30	Horizontal	Vertical	Pass
578.778	-49.62	6.61	-13.0	36.62	64.90	Horizontal	Vertical	Pass
770.474	-52.18	7.12	-13.0	39.18	271.00	Horizontal	Vertical	Pass
1913.500	-17.09	12.94	-13.0	4.09	327.70	Horizontal	Vertical	Pass
2870.750	-19.42	17.59	-13.0	6.42	73.30	Horizontal	Vertical	Pass
9211.625	-35.50	17.20	-13.0	22.50	337.30	Horizontal	Vertical	Pass

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 1		



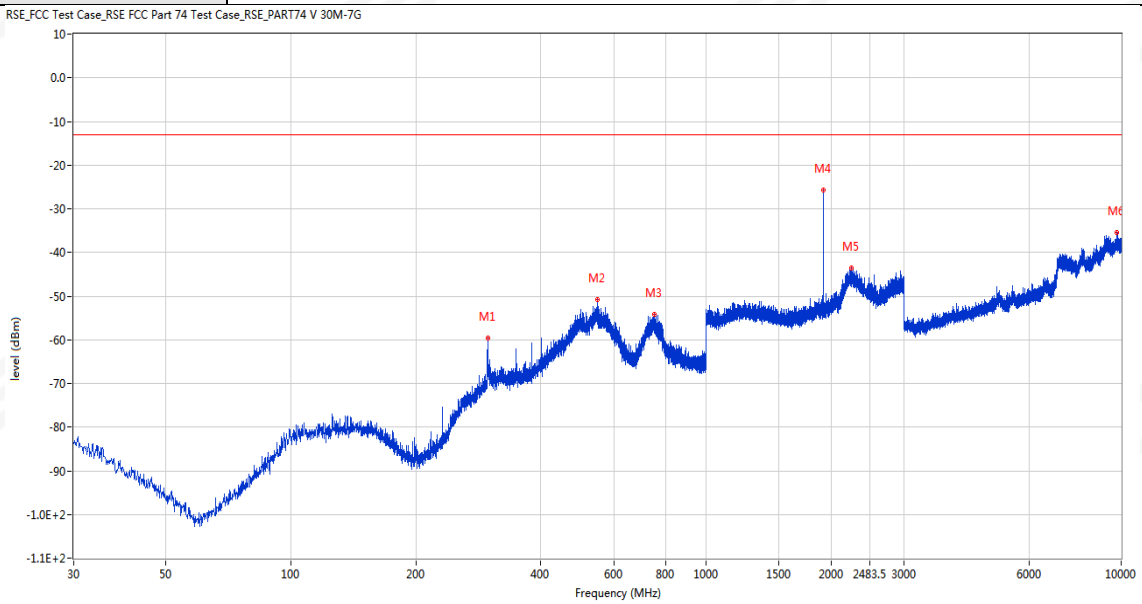
Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
334.822	-58.34	-2.30	-13.0	45.34	107.80	Vertical	Vertical	Pass
551.617	-51.79	6.23	-13.0	38.79	280.00	Vertical	Vertical	Pass
743.071	-54.36	7.60	-13.0	41.36	206.00	Vertical	Vertical	Pass
1913.250	-25.67	12.94	-13.0	12.67	296.40	Vertical	Vertical	Pass
2870.000	-41.46	17.59	-13.0	28.46	5.10	Vertical	Vertical	Pass
9804.000	-34.73	17.24	-13.0	21.73	216.40	Vertical	Vertical	Pass

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 2		



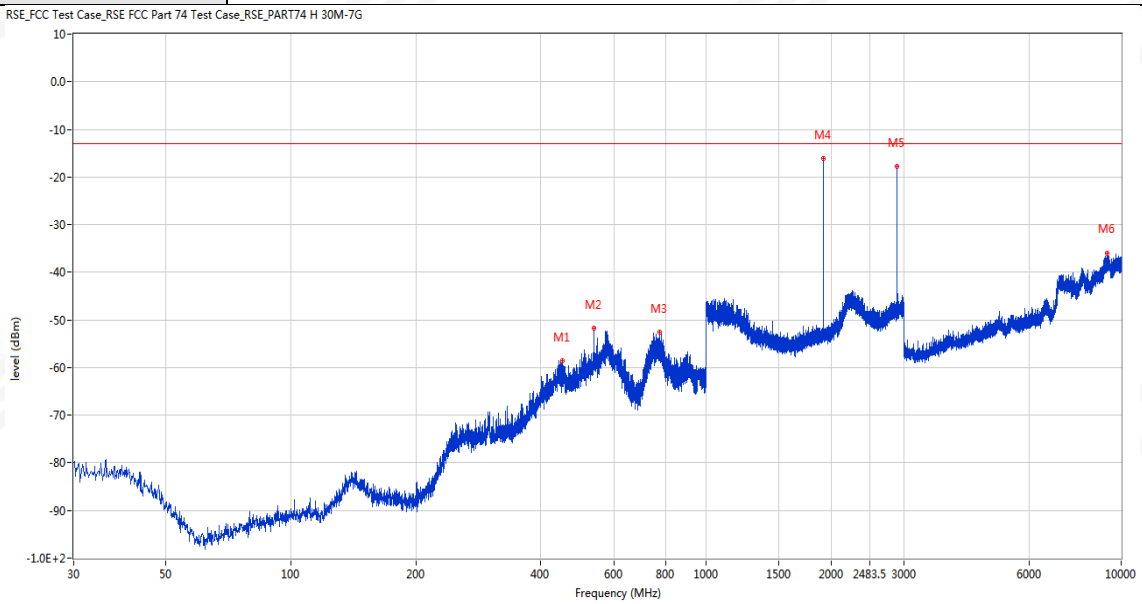
Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
439.582	-57.43	3.40	-13.0	44.43	275.50	Horizontal	Vertical	Pass
573.564	-53.11	6.18	-13.0	40.11	55.00	Horizontal	Vertical	Pass
766.715	-53.10	7.17	-13.0	40.10	271.40	Horizontal	Vertical	Pass
1916.250	-16.00	12.94	-13.0	3.00	302.70	Horizontal	Vertical	Pass
2874.750	-17.53	17.58	-13.0	4.53	314.60	Horizontal	Vertical	Pass
9847.750	-36.03	17.19	-13.0	23.03	188.80	Horizontal	Vertical	Pass

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 2		



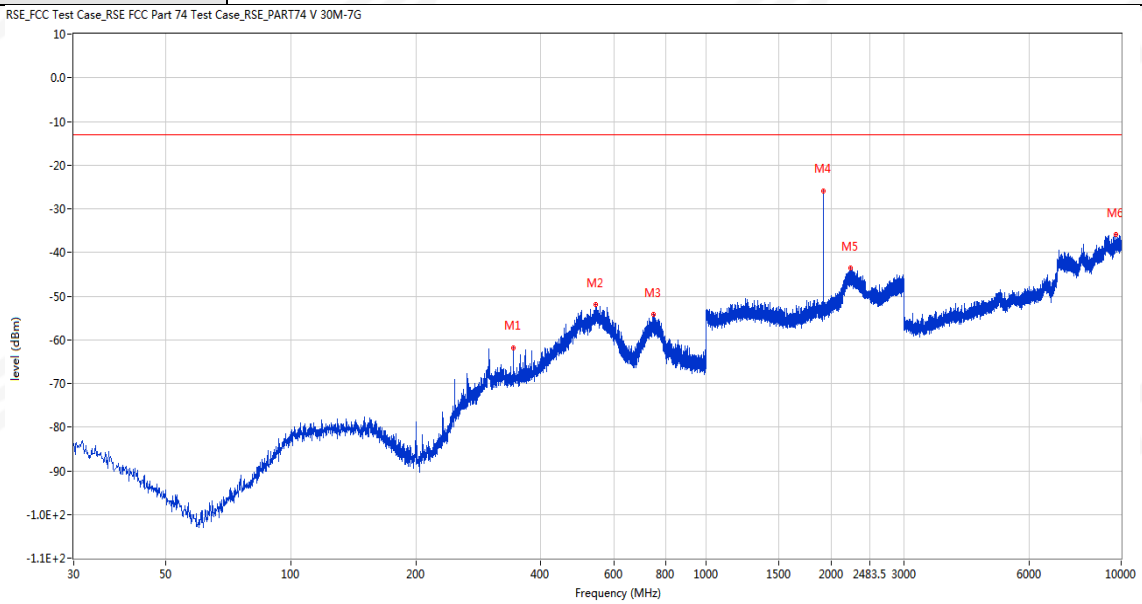
Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
297.962	-59.66	-3.70	-13.0	46.66	127.00	Vertical	Vertical	Pass
547.616	-50.90	6.13	-13.0	37.90	226.40	Vertical	Vertical	Pass
749.376	-54.10	7.43	-13.0	41.10	195.50	Vertical	Vertical	Pass
1916.500	-25.66	12.94	-13.0	12.66	29.00	Vertical	Vertical	Pass
2235.500	-43.46	19.66	-13.0	30.46	1.90	Vertical	Vertical	Pass
9737.500	-35.48	17.42	-13.0	22.48	165.40	Vertical	Vertical	Pass

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 3		



Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
510.392	-55.64	1.15	-13.0	42.64	249.70	Horizontal	Vertical	Pass
579.263	-53.13	6.65	-13.0	40.13	51.50	Horizontal	Vertical	Pass
750.346	-51.86	7.17	-13.0	38.86	40.40	Horizontal	Vertical	Pass
1903.500	-17.95	12.94	-13.0	4.95	303.80	Horizontal	Vertical	Pass
2856.000	-18.47	17.62	-13.0	5.47	311.20	Horizontal	Vertical	Pass
9692.875	-35.81	17.46	-13.0	22.81	340.10	Horizontal	Vertical	Pass

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 3		

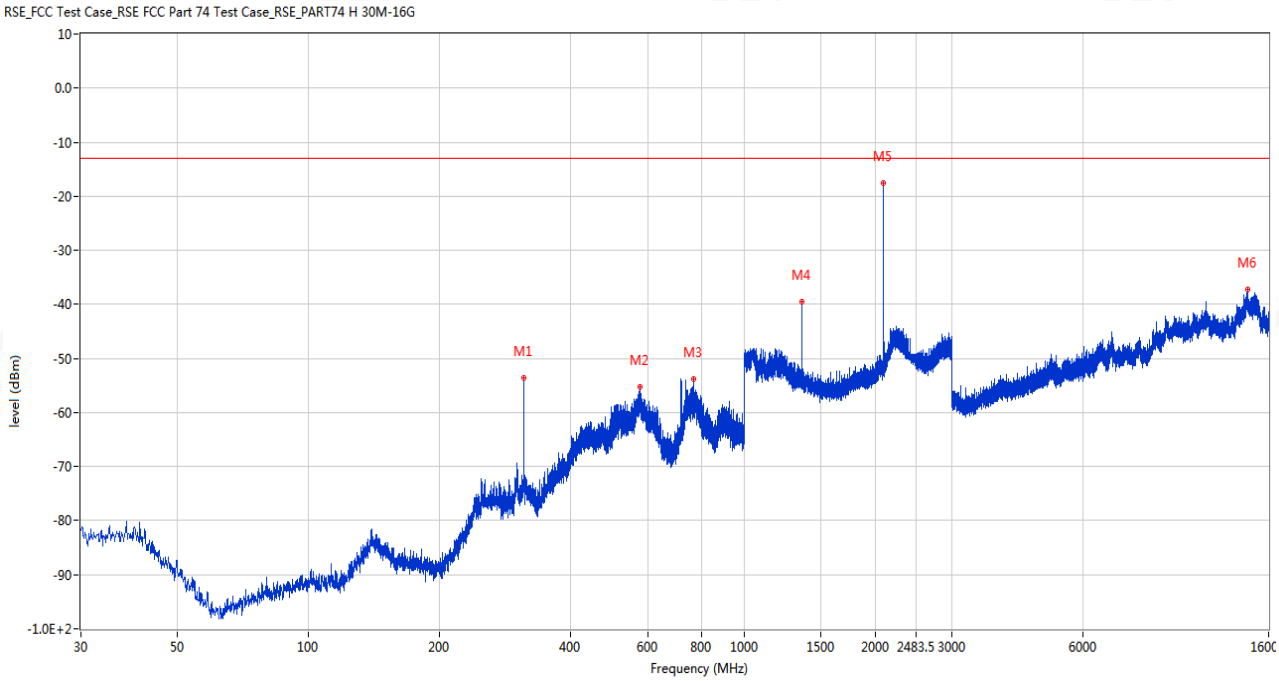


Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
343.068	-61.76	-2.24	-13.0	48.76	274.00	Vertical	Vertical	Pass
542.645	-51.87	6.01	-13.0	38.87	251.00	Vertical	Vertical	Pass
747.073	-54.21	7.49	-13.0	41.21	68.30	Vertical	Vertical	Pass
1919.750	-25.82	12.94	-13.0	12.82	313.10	Vertical	Vertical	Pass
2231.750	-43.57	19.66	-13.0	30.57	0.00	Vertical	Vertical	Pass
9715.625	-35.87	17.48	-13.0	22.87	242.80	Vertical	Vertical	Pass

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 5		

Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
312.027	-53.53	-7.19	-13.0	40.53	86.90	Horizontal	Vertical	Pass
575.140	-55.20	6.31	-13.0	42.20	275.50	Horizontal	Vertical	Pass
766.594	-53.82	7.17	-13.0	40.82	286.70	Horizontal	Vertical	Pass
1357.250	-39.58	12.36	-13.0	26.58	319.60	Horizontal	Vertical	Pass
2090.250	-17.58	15.00	-13.0	4.58	327.40	Horizontal	Vertical	Pass
14321.500	-37.19	19.44	-13.0	24.19	218.40	Horizontal	Vertical	Pass

Remark:
1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



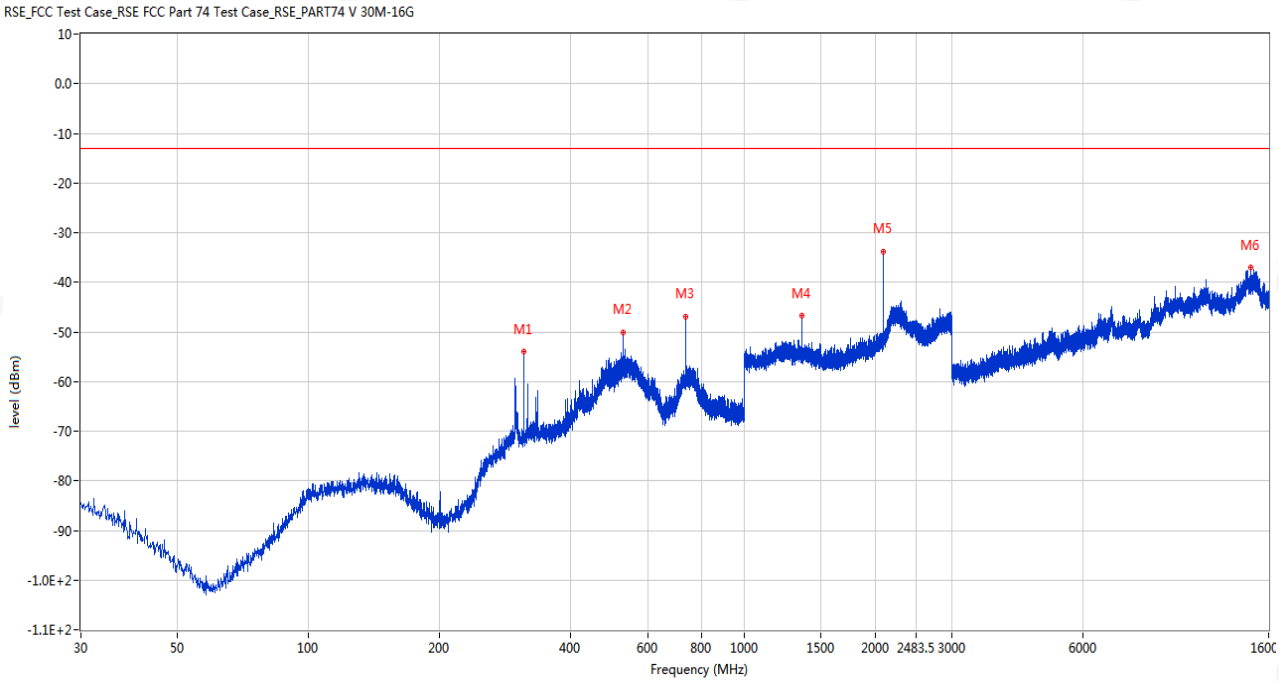
Note:

1) Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
2) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 5		

Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
311.664	-53.93	-2.83	-13.0	40.93	23.60	Vertical	Vertical	Pass
527.004	-50.18	5.03	-13.0	37.18	69.00	Vertical	Vertical	Pass
733.371	-47.05	7.88	-13.0	34.05	161.60	Vertical	Vertical	Pass
1357.000	-46.62	12.36	-13.0	33.62	332.70	Vertical	Vertical	Pass
2090.500	-33.80	15.01	-13.0	20.80	165.60	Vertical	Vertical	Pass
14576.874	-37.06	18.02	-13.0	24.06	53.20	Vertical	Vertical	Pass

Remark:
3. Margin = Result (Result =Reading + Factor)–Limit
4. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



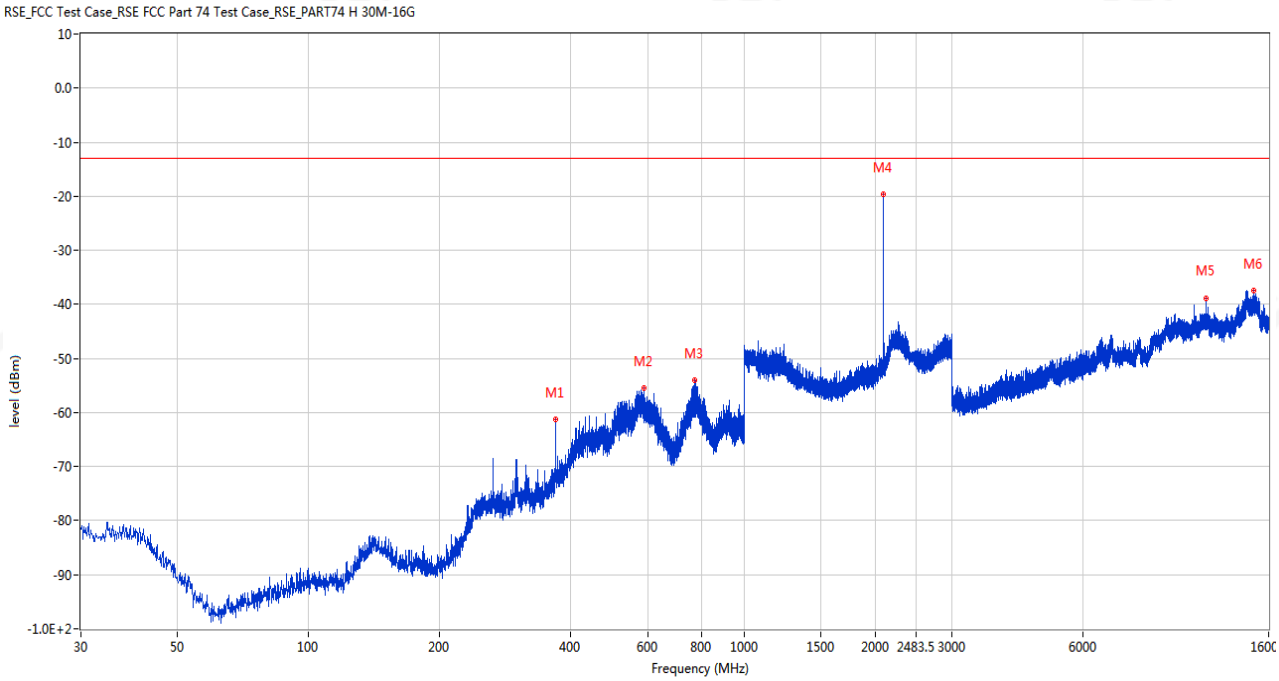
Note:

1) Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
2) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 6		

Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
368.409	-61.36	-2.41	-13.0	48.36	67.90	Horizontal	Vertical	Pass
589.811	-55.54	6.37	-13.0	42.54	261.80	Horizontal	Vertical	Pass
770.110	-54.09	7.12	-13.0	41.09	45.20	Horizontal	Vertical	Pass
2090.250	-19.61	15.00	-13.0	6.61	67.00	Horizontal	Vertical	Pass
11495.500	-38.85	15.43	-13.0	25.85	206.20	Horizontal	Vertical	Pass
14798.500	-37.40	19.20	-13.0	24.40	21.60	Horizontal	Vertical	Pass

Remark:
5. Margin = Result (Result =Reading + Factor)–Limit
6. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



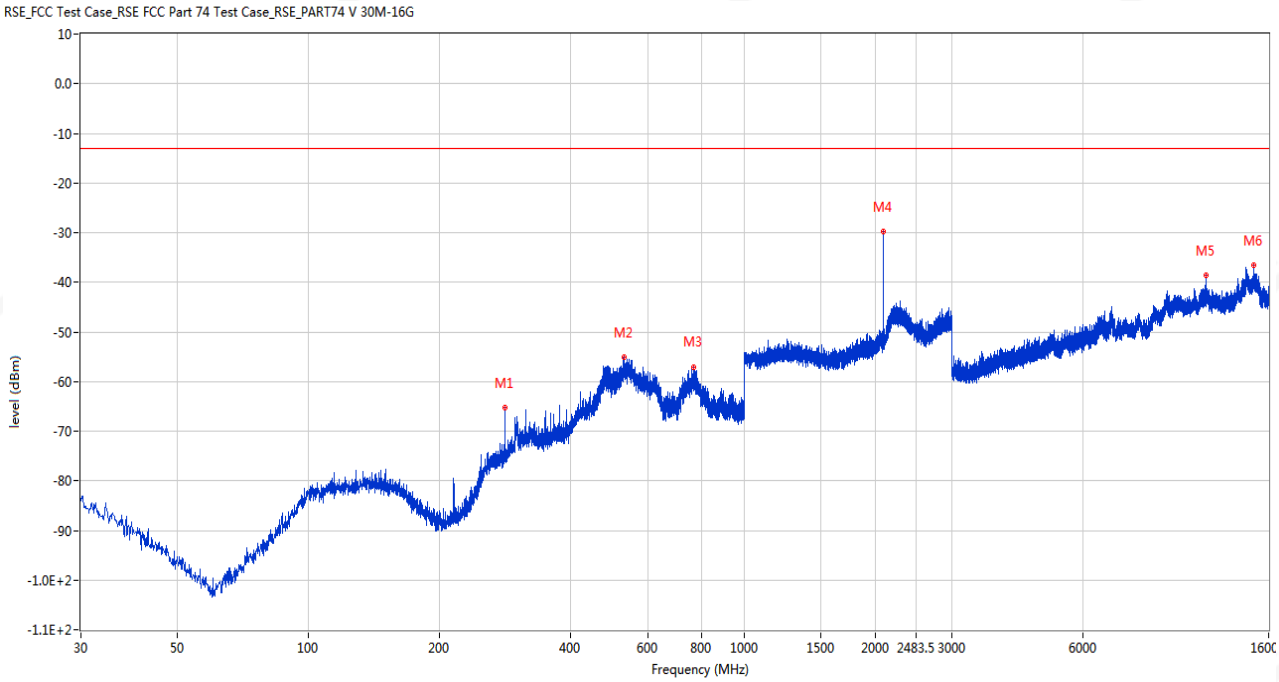
Note:

1) Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
2) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 6		

Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
281.715	-65.36	-5.36	-13.0	52.36	26.60	Vertical	Vertical	Pass
529.671	-55.07	5.22	-13.0	42.07	177.30	Vertical	Vertical	Pass
764.290	-57.01	7.06	-13.0	44.01	349.60	Vertical	Vertical	Pass
2090.500	-29.75	15.01	-13.0	16.75	57.00	Vertical	Vertical	Pass
11496.625	-38.58	15.44	-13.0	25.58	54.70	Vertical	Vertical	Pass
14819.875	-36.58	18.99	-13.0	23.58	225.90	Vertical	Vertical	Pass

Remark:
7. Margin = Result (Result =Reading + Factor)–Limit
8. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



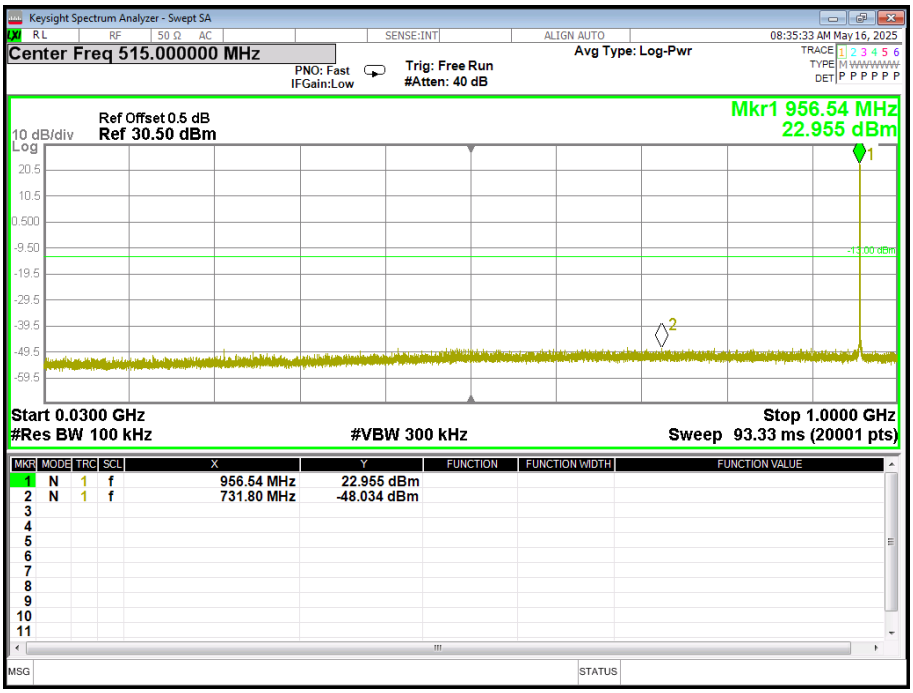
Note:

1) Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
2) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

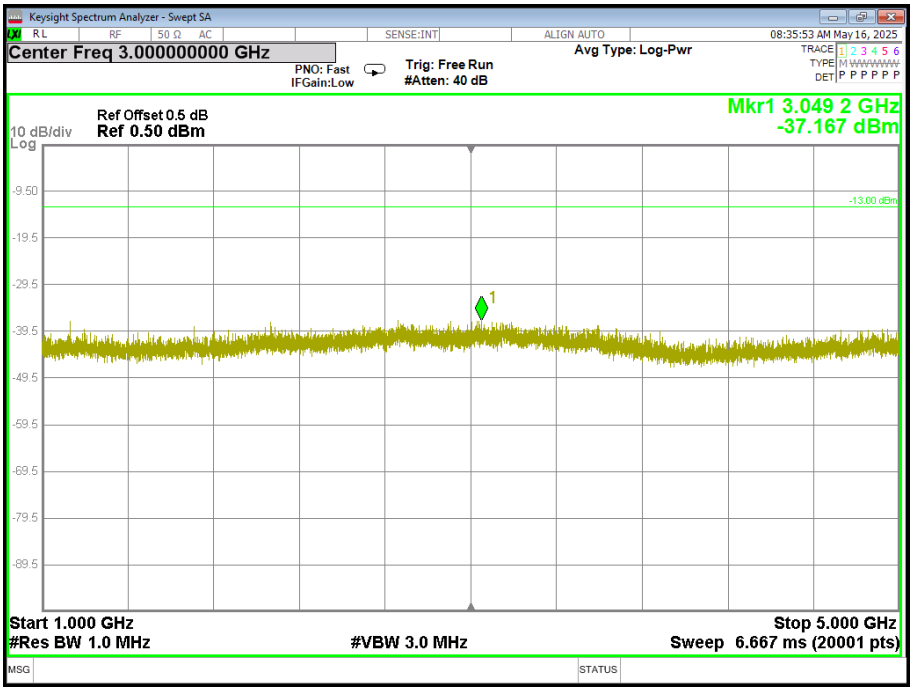
TEST RESULT

Mode 1

30MHz-1GHz

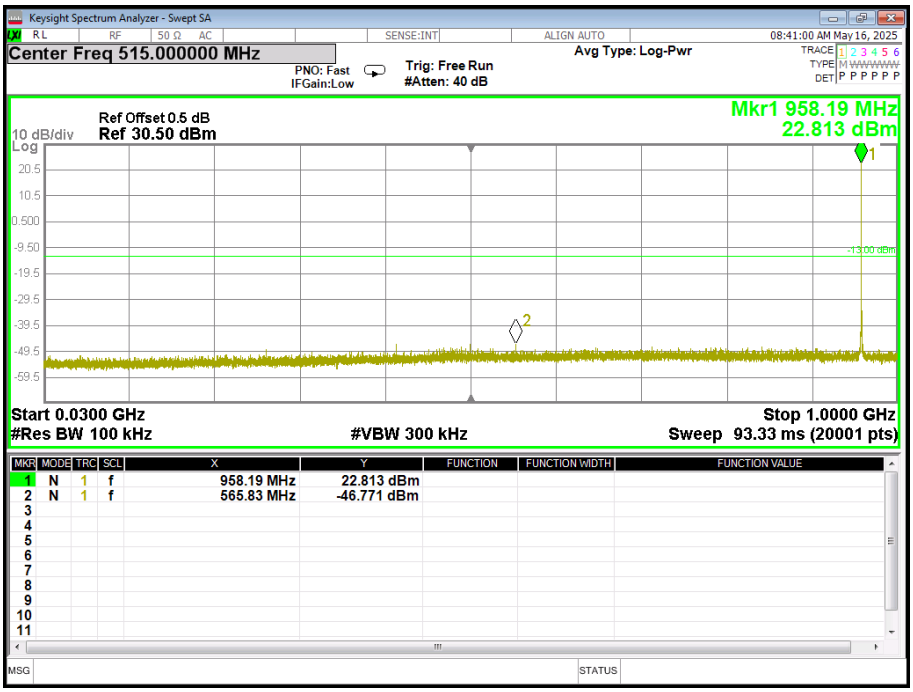


1GHz-5GHz

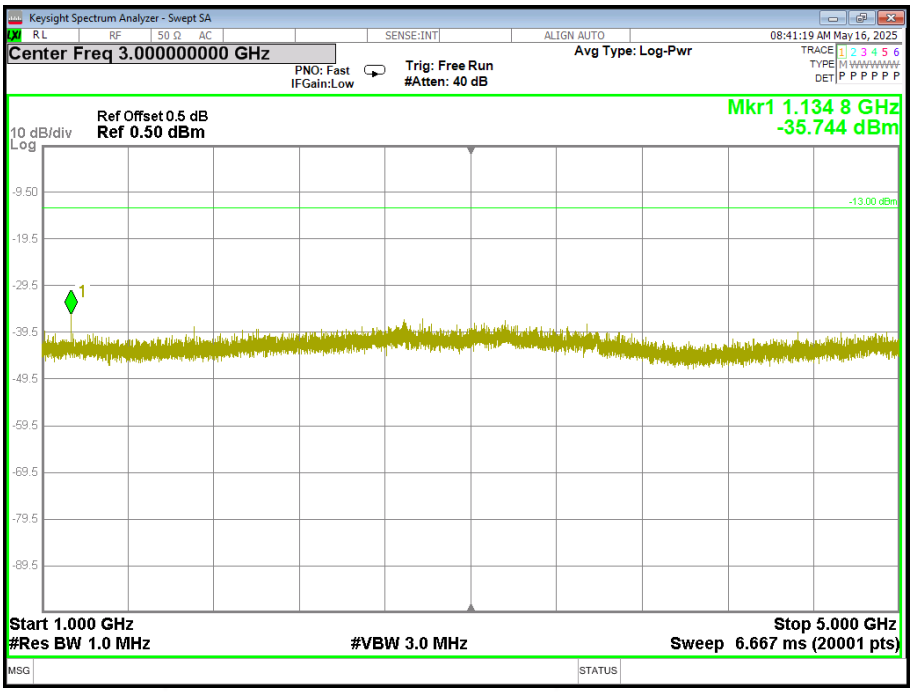


Mode 2

30MHz-1GHz

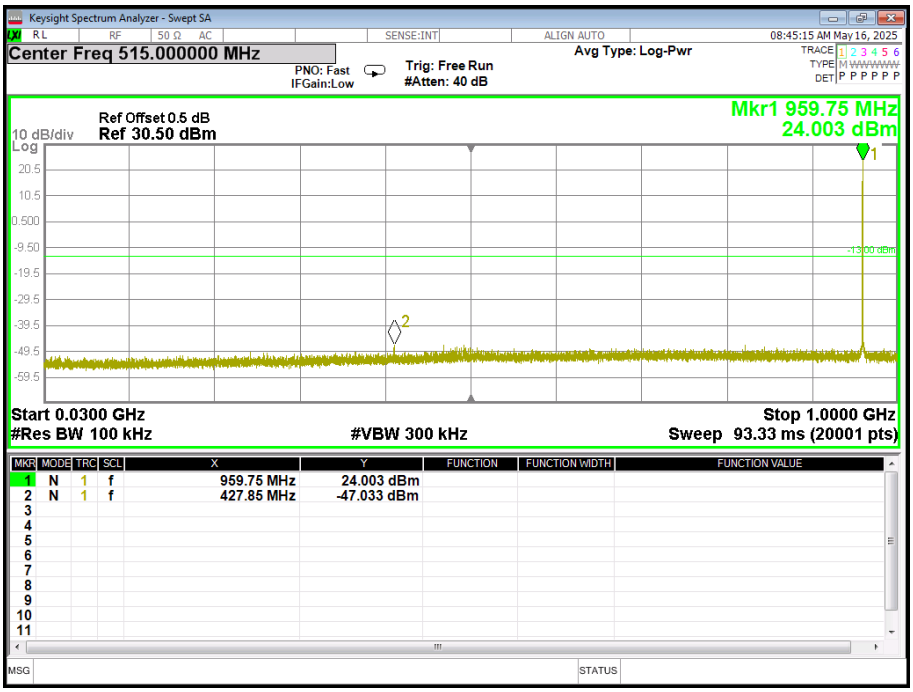


1GHz-5GHz

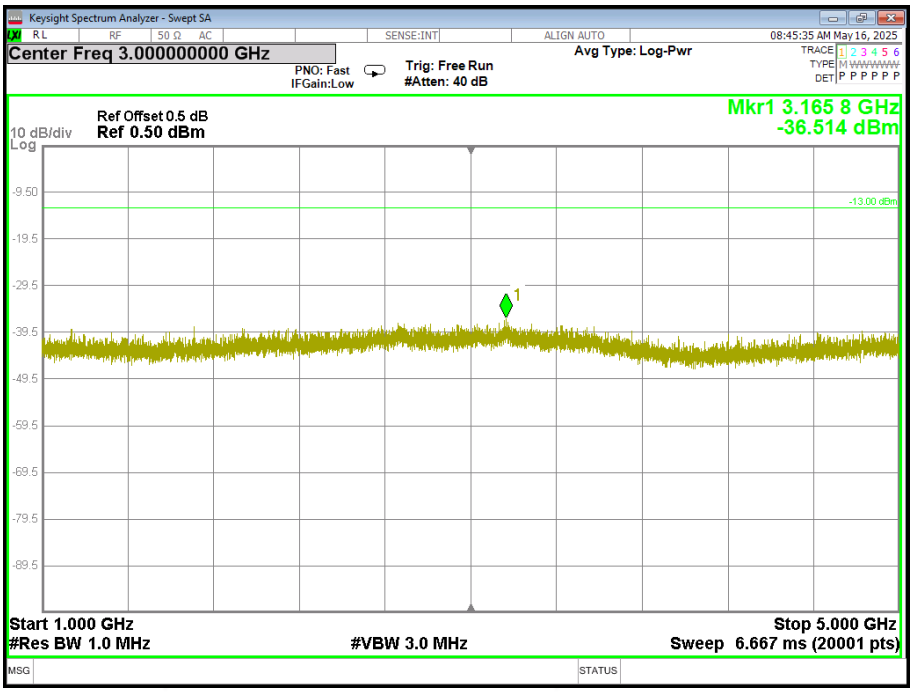


Mode 3

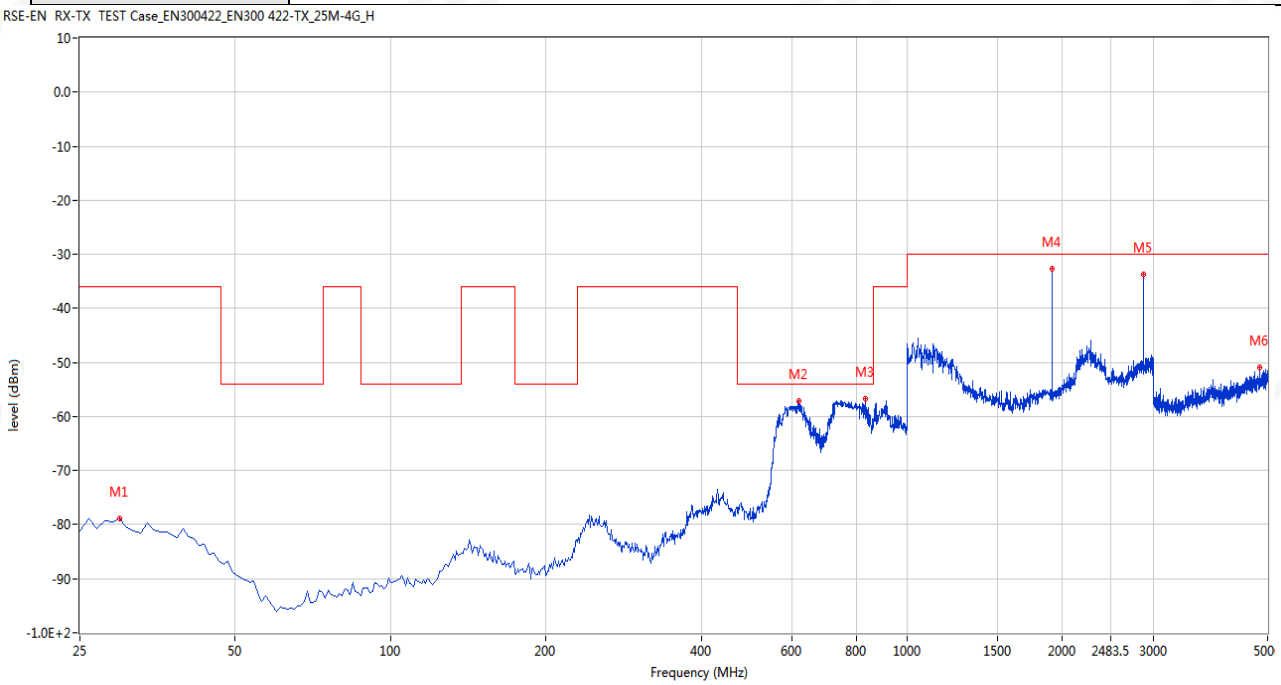
30MHz-1GHz



1GHz-5GHz

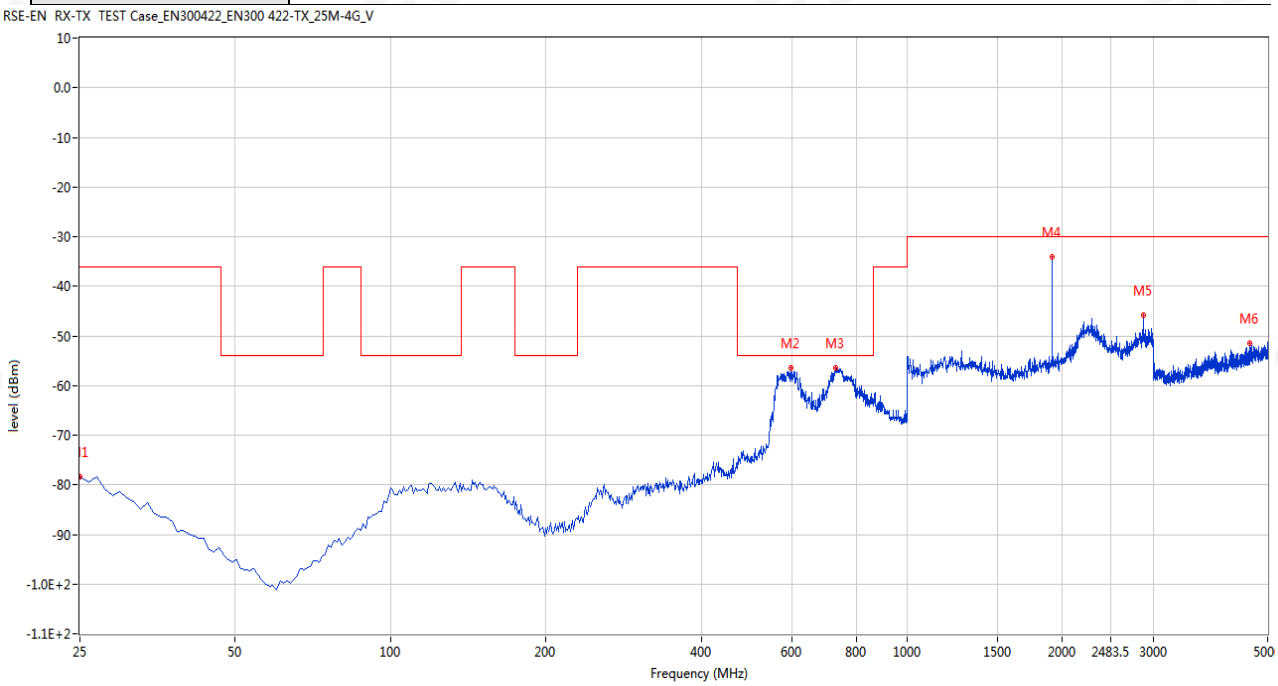


Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 1		



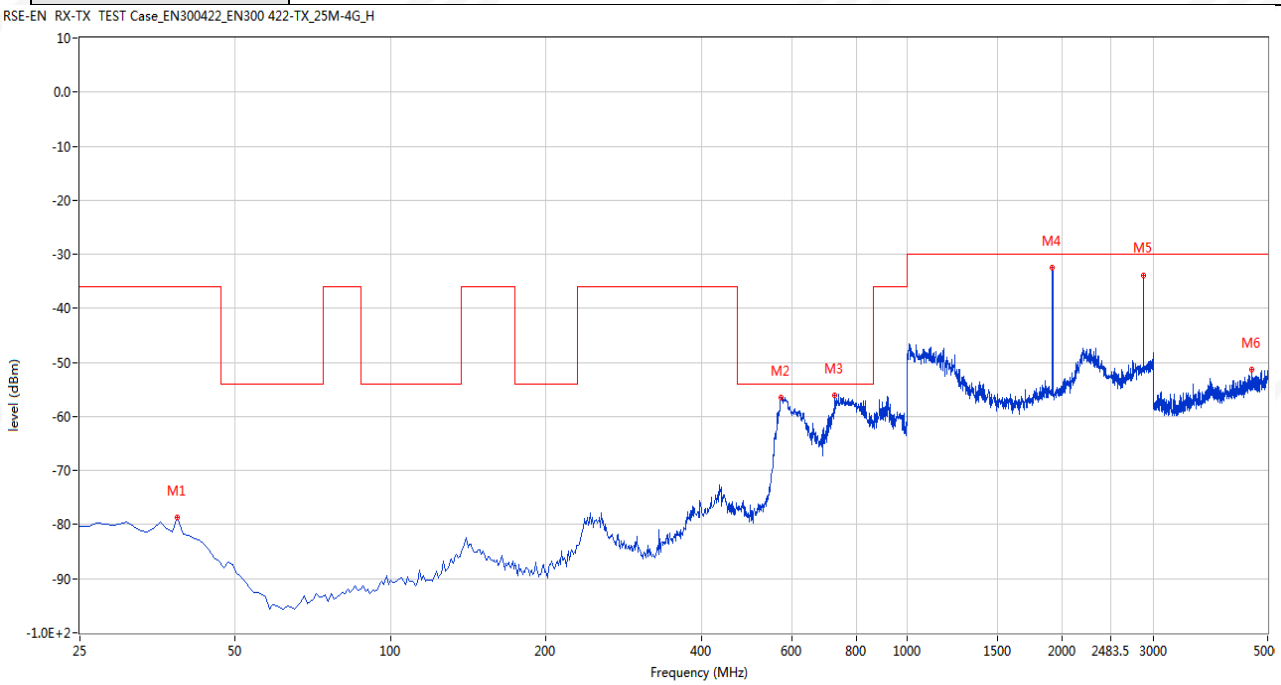
Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
29.875	-78.86	-1.92	-36.0	42.86	107.40	**Horizontal**	**Vertical**	**Pass**
618.775	-57.13	7.20	-54.0	3.13	57.60	**Horizontal**	**Vertical**	**Pass**
832.300	-56.75	6.93	-54.0	2.75	50.90	**Horizontal**	**Vertical**	**Pass**
1914.000	-32.72	12.94	-30.0	2.72	349.20	**Horizontal**	**Vertical**	**Pass**
2872.000	-33.80	17.59	-30.0	3.80	80.20	**Horizontal**	**Vertical**	**Pass**
4834.000	-50.93	4.96	-30.0	20.93	32.00	**Horizontal**	**Vertical**	**Pass**

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 1		



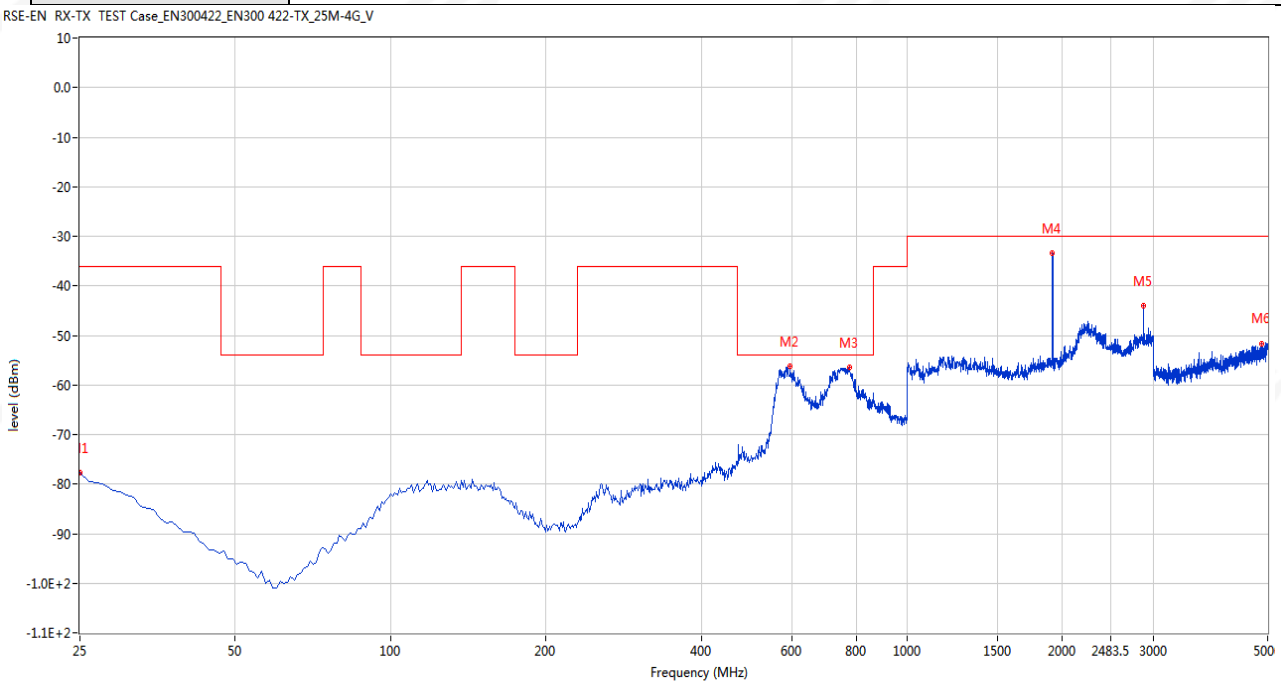
Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
25.000	-78.25	-0.46	-36.0	42.25	276.30	Vertical	Vertical	Pass
597.325	-56.55	4.82	-54.0	2.55	82.00	Vertical	Vertical	Pass
727.975	-56.38	8.03	-54.0	2.38	229.00	Vertical	Vertical	Pass
1914.000	-34.00	12.94	-30.0	4.00	0.00	Vertical	Vertical	Pass
2872.000	-45.82	17.59	-30.0	15.82	2.70	Vertical	Vertical	Pass
4622.000	-51.51	4.39	-30.0	21.51	76.00	Vertical	Vertical	Pass

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 2		



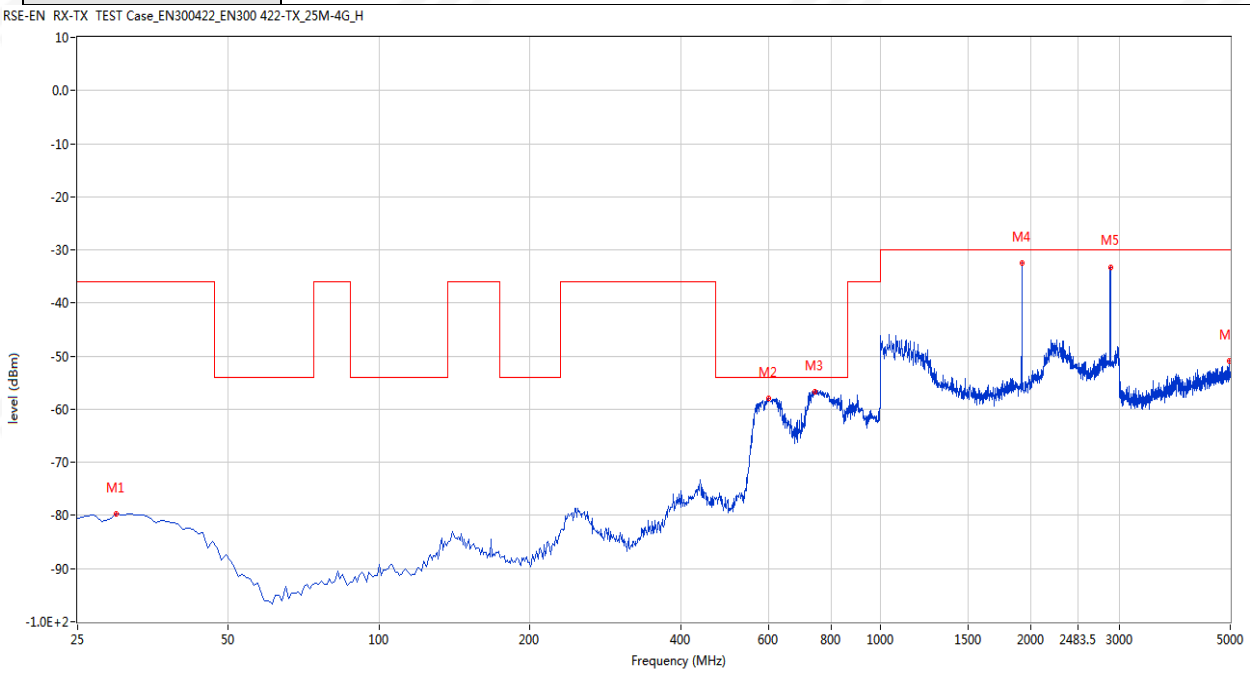
Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
38.650	-78.74	-1.85	-36.0	42.74	349.20	Horizontal	Vertical	Pass
571.000	-56.41	5.96	-54.0	2.41	87.20	Horizontal	Vertical	Pass
726.025	-56.10	6.48	-54.0	2.10	281.90	Horizontal	Vertical	Pass
1916.000	-32.49	12.94	-30.0	2.49	65.40	Horizontal	Vertical	Pass
2876.000	-33.84	17.58	-30.0	3.84	330.40	Horizontal	Vertical	Pass
4668.000	-51.32	4.52	-30.0	21.32	265.50	Horizontal	Vertical	Pass

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 2		



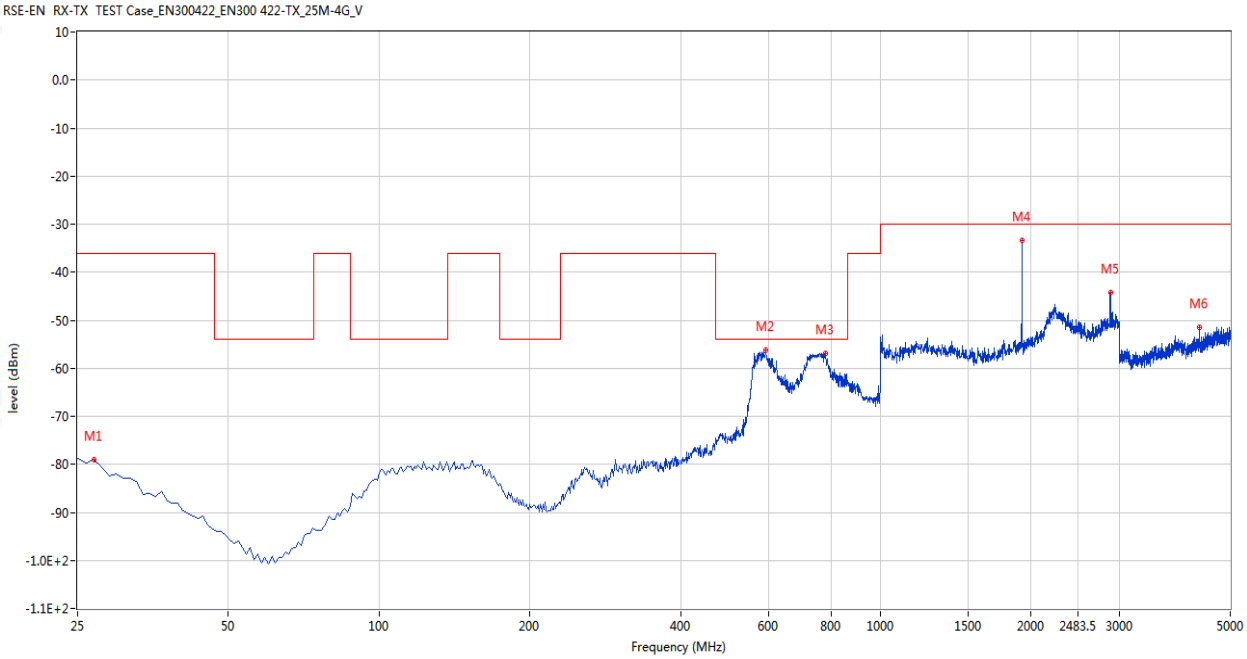
Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
25.000	-77.64	-0.46	-36.0	41.64	325.80	Vertical	Vertical	Pass
594.400	-56.32	4.94	-54.0	2.32	111.80	Vertical	Vertical	Pass
773.800	-56.34	6.90	-54.0	2.34	44.40	Vertical	Vertical	Pass
1916.000	-33.30	12.94	-30.0	3.30	27.00	Vertical	Vertical	Pass
2876.000	-43.96	17.58	-30.0	13.96	37.00	Vertical	Vertical	Pass
4864.000	-51.59	5.19	-30.0	21.59	224.90	Vertical	Vertical	Pass

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 3		



Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
29.875	-79.74	-1.92	-36.0	43.74	140.60	Horizontal	Vertical	Pass
598.300	-57.00	6.08	-54.0	3.00	252.50	Horizontal	Vertical	Pass
741.625	-56.14	7.09	-54.0	2.14	50.20	Horizontal	Vertical	Pass
1920.000	-32.53	12.94	-30.0	2.53	308.60	Horizontal	Vertical	Pass
2882.000	-33.38	17.57	-30.0	3.38	322.40	Horizontal	Vertical	Pass
4976.000	-50.88	5.99	-30.0	20.88	262.50	Horizontal	Vertical	Pass

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 3		

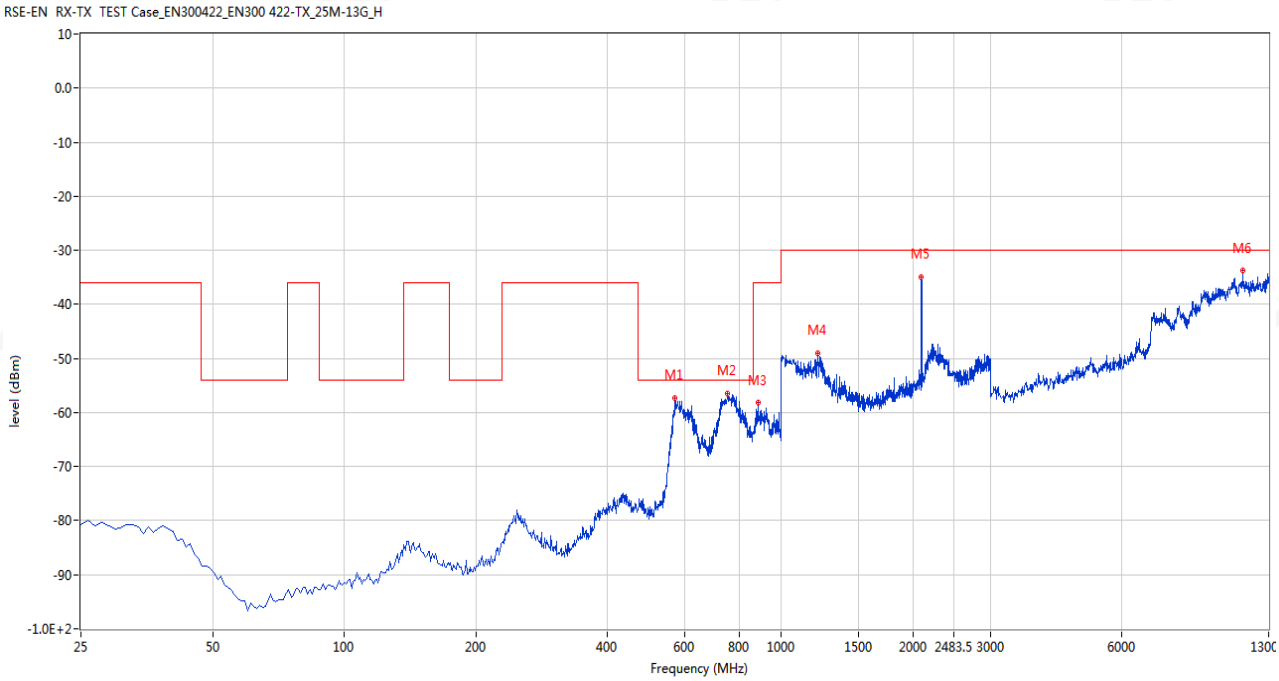


Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
26.950	-79.13	-1.72	-36.0	43.13	99.60	Vertical	Vertical	Pass
591.475	-56.26	5.06	-54.0	2.26	106.00	Vertical	Vertical	Pass
777.700	-56.78	6.84	-54.0	2.78	216.70	Vertical	Vertical	Pass
1920.000	-33.30	12.94	-30.0	3.30	228.70	Vertical	Vertical	Pass
2882.000	-44.30	17.57	-30.0	14.30	249.50	Vertical	Vertical	Pass
4342.000	-51.52	3.67	-30.0	21.52	76.20	Vertical	Vertical	Pass

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 5		

Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
571.000	-57.36	5.96	-54.0	3.36	267.50	Horizontal	Vertical	Pass
753.325	-56.40	7.20	-54.0	2.40	291.70	Horizontal	Vertical	Pass
884.950	-58.16	8.27	-36.0	22.16	308.50	Horizontal	Vertical	Pass
1212.000	-48.94	12.64	-30.0	18.94	325.00	Horizontal	Vertical	Pass
2090.000	-34.97	15.00	-30.0	4.97	328.30	Horizontal	Vertical	Pass
11360.000	-33.71	20.03	-30.0	3.71	69.60	Horizontal	Vertical	Pass

Remark:
9. Margin = Result (Result =Reading + Factor)–Limit
10. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



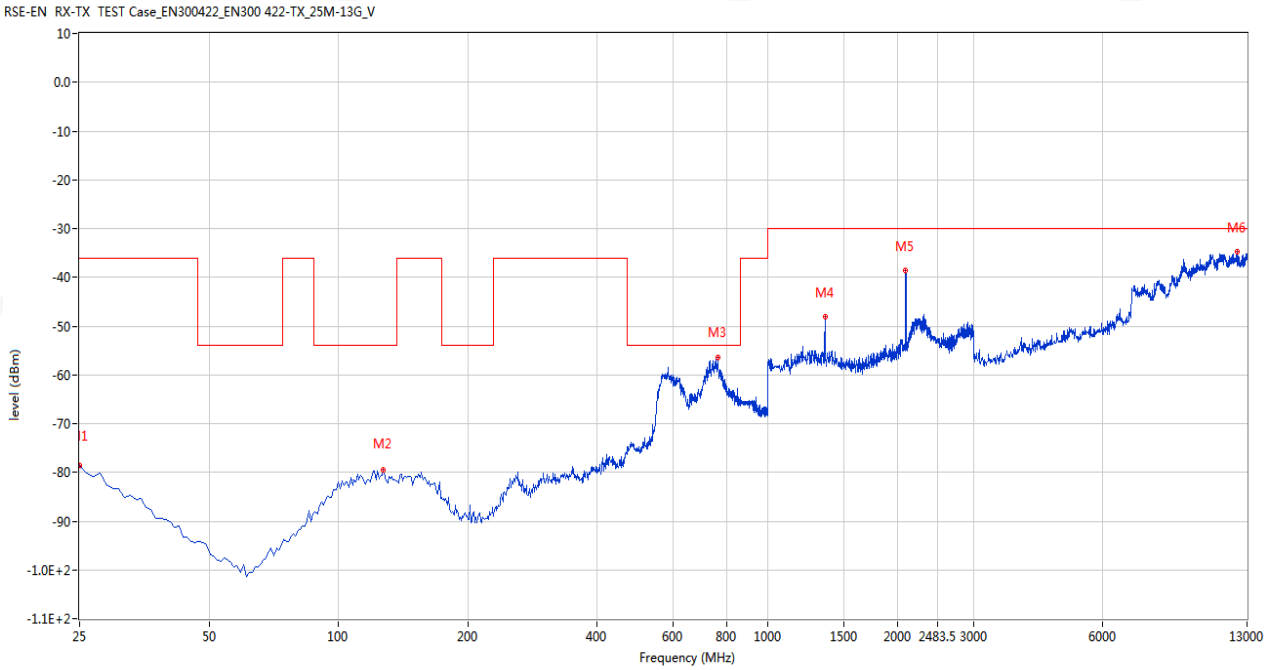
Note:

1) Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
2) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 5		

Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
25.000	-78.53	-0.46	-36.0	42.53	354.60	Vertical	Vertical	Pass
127.375	-79.40	-1.62	-54.0	25.40	169.30	Vertical	Vertical	Pass
765.025	-56.43	7.05	-54.0	2.43	145.80	Vertical	Vertical	Pass
1356.000	-48.14	12.37	-30.0	18.14	291.10	Vertical	Vertical	Pass
2090.000	-38.67	15.00	-30.0	8.67	242.80	Vertical	Vertical	Pass
12310.000	-34.84	19.73	-30.0	4.84	163.40	Vertical	Vertical	Pass

Remark:
11. Margin = Result (Result =Reading + Factor)–Limit
12. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



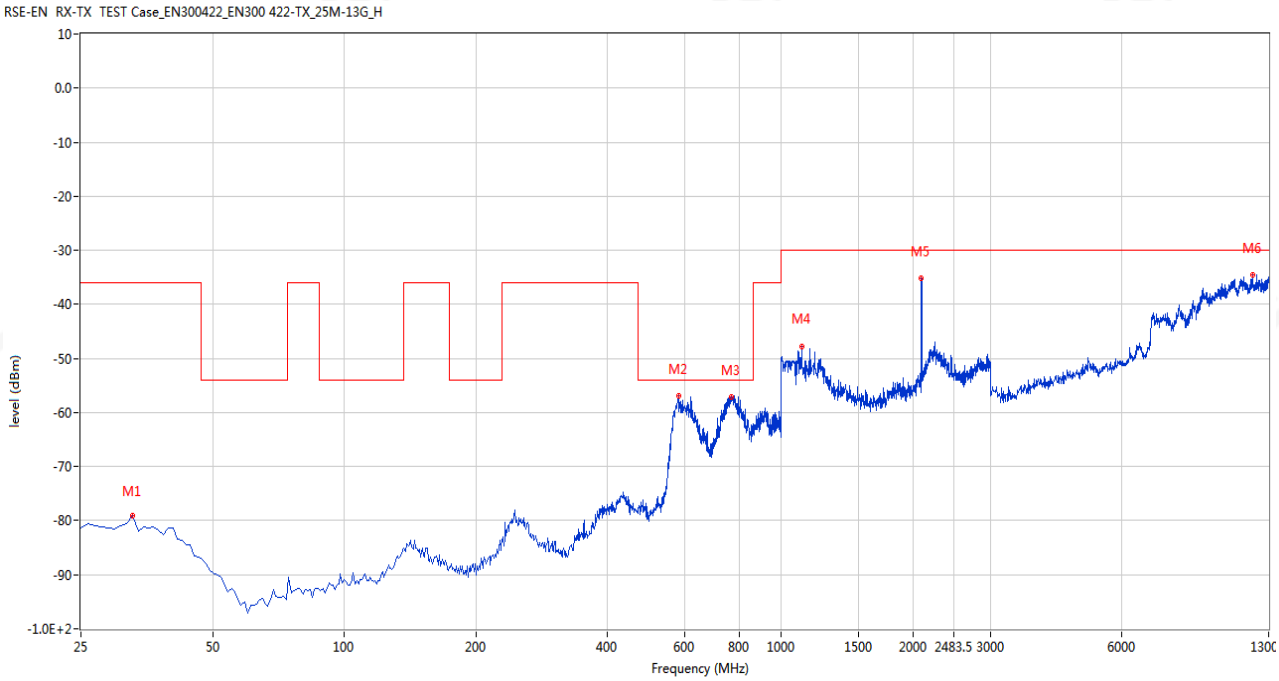
Note:

1) Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
2) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 6		

Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
32.800	-79.14	-1.89	-36.0	43.14	0.30	Horizontal	Vertical	Pass
581.725	-56.83	6.65	-54.0	2.83	278.20	Horizontal	Vertical	Pass
767.950	-56.34	7.15	-54.0	2.34	48.60	Horizontal	Vertical	Pass
1114.000	-47.70	11.24	-30.0	17.70	322.60	Horizontal	Vertical	Pass
2090.000	-35.25	15.00	-30.0	5.25	70.30	Horizontal	Vertical	Pass
11940.000	-34.55	19.53	-30.0	4.55	213.00	Horizontal	Vertical	Pass

Remark:
13. Margin = Result (Result =Reading + Factor)–Limit
14. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



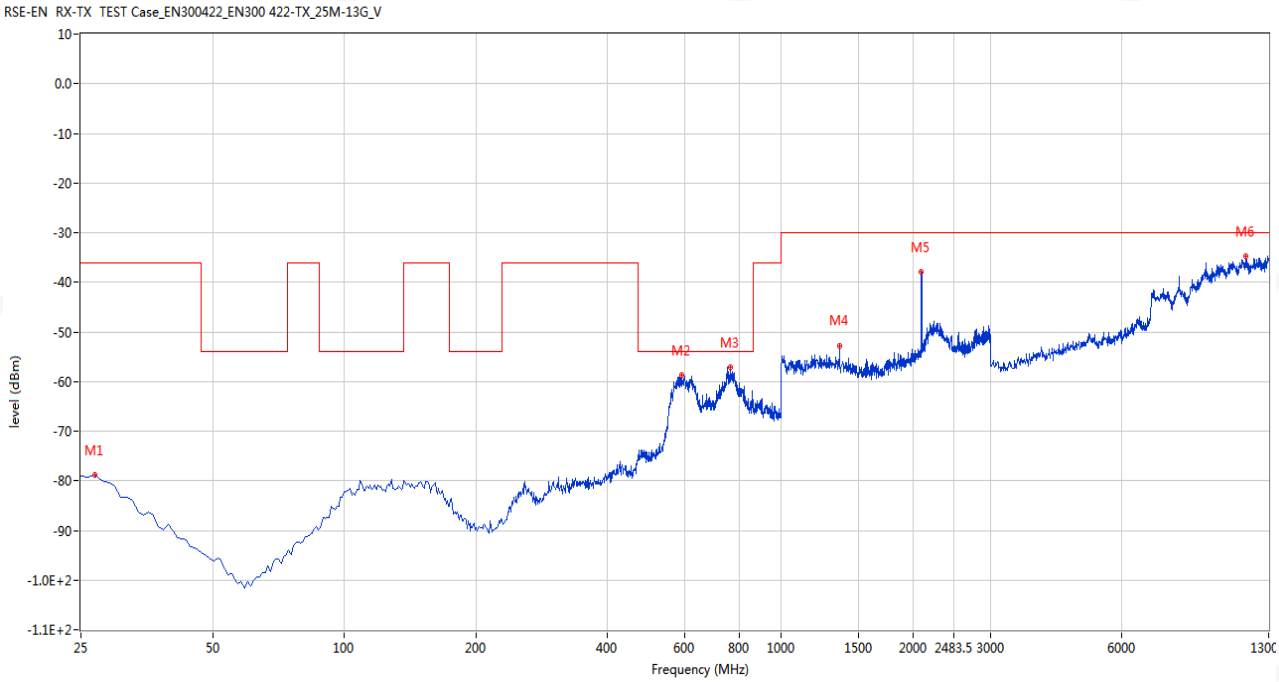
Note:

1) Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
2) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

Temperature:	23.4℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 6		

Frequency (MHz)	Result (dBm)	Factor (dB)	Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
26.950	-78.77	-1.72	-36.0	42.77	48.40	Vertical	Vertical	Pass
591.475	-58.67	5.06	-54.0	4.67	360.00	Vertical	Vertical	Pass
762.100	-57.06	7.10	-54.0	3.06	338.30	Vertical	Vertical	Pass
1358.000	-52.72	12.36	-30.0	22.72	329.50	Vertical	Vertical	Pass
2090.000	-37.91	15.00	-30.0	7.91	44.80	Vertical	Vertical	Pass
11550.000	-34.79	20.63	-30.0	4.79	141.10	Vertical	Vertical	Pass

Remark:
15. Margin = Result (Result =Reading + Factor)–Limit
16. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

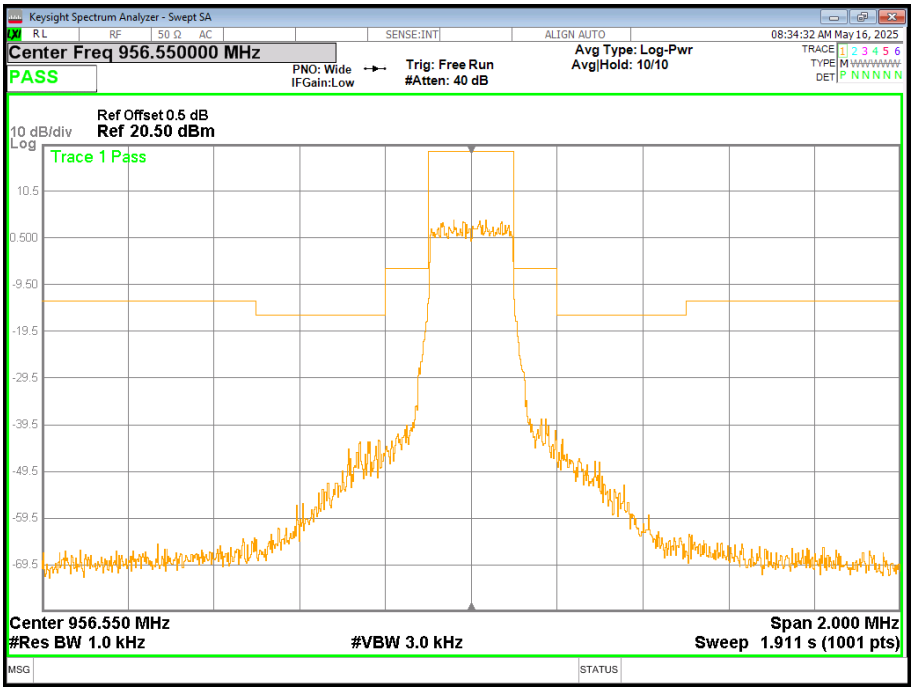


Note:

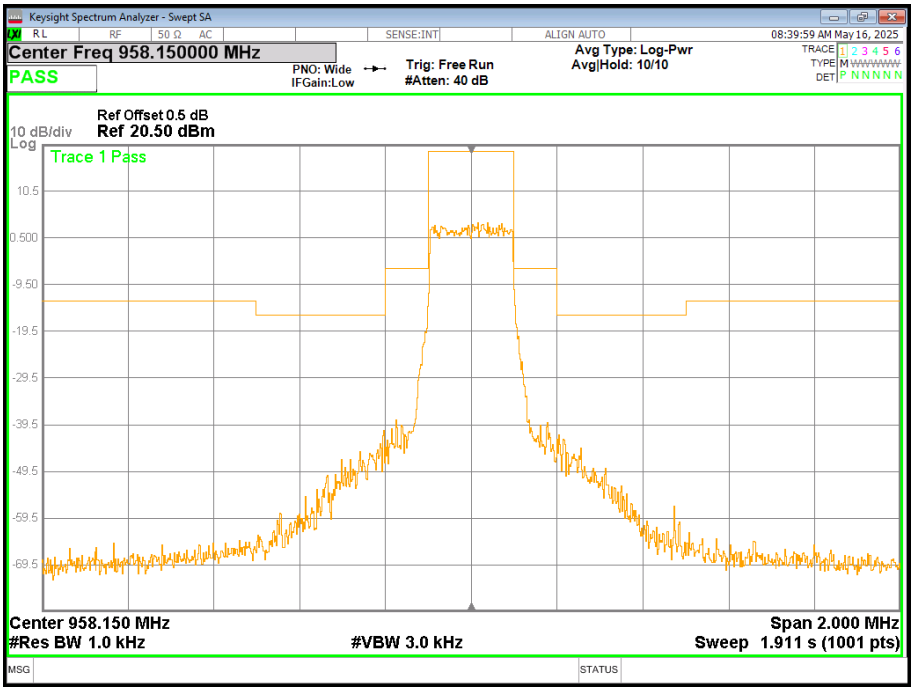
1) Factor = Antenna Factor + Cable Loss – Pre-amplifier.
   Emission Level = Reading + Factor
2) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

Emission Mask I

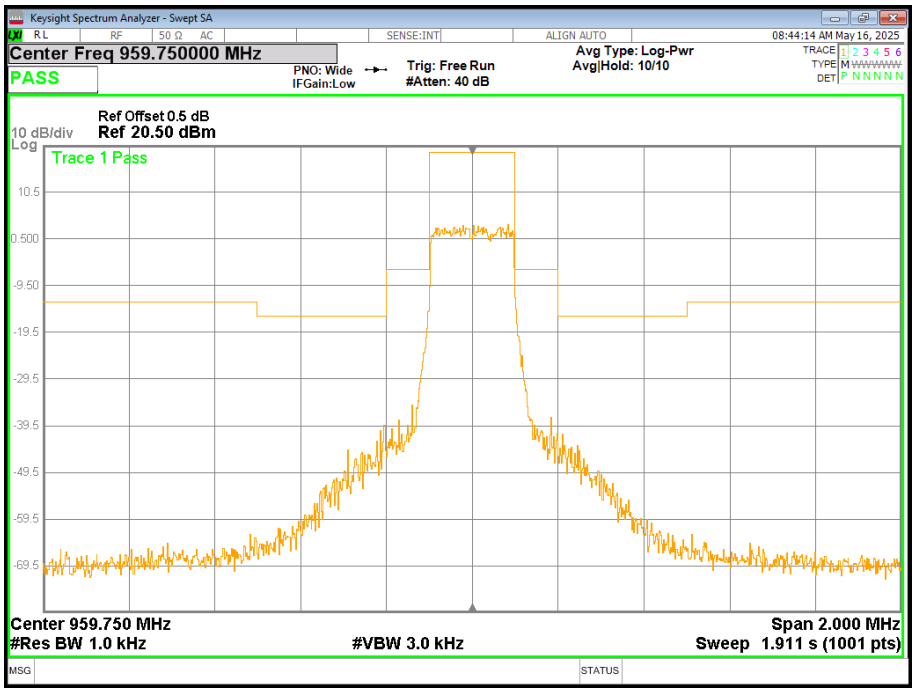
Mode 1



Mode 2

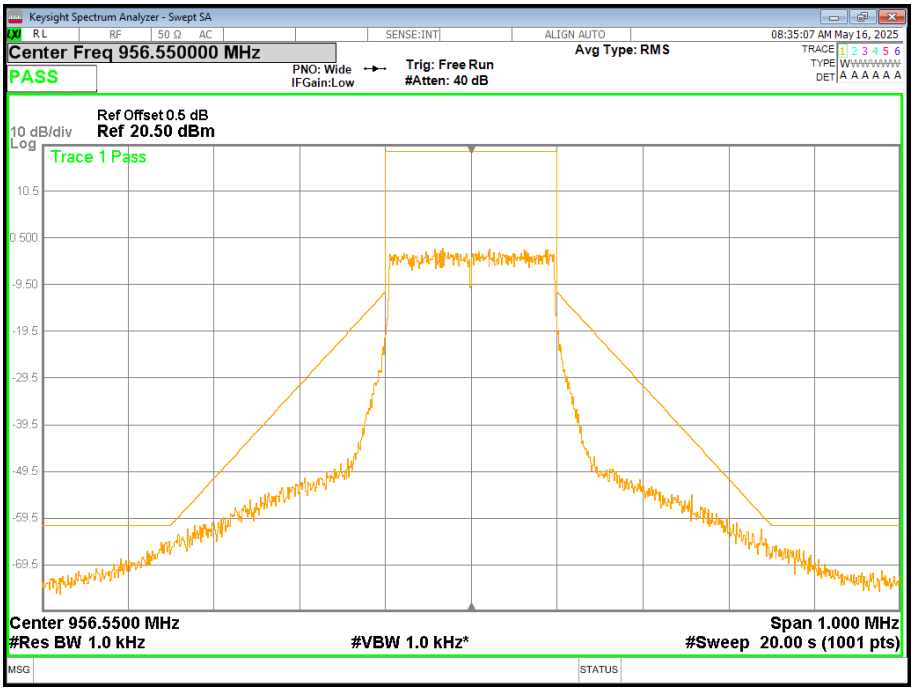


Mode 3

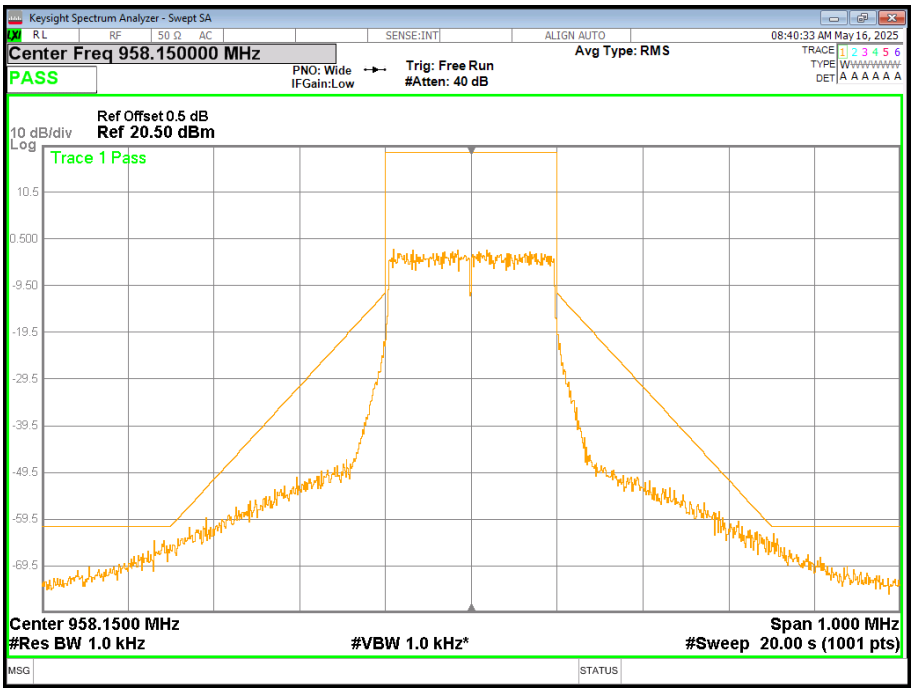

Keysight Spectrum Analyzer - Swept SA
Center Freq 959.750000 MHz
PASS
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
08:44:14 AM May 16, 2025
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Log
Trace 1 Pass
10.5
0.500
-9.50
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Center 959.750 MHz
#Res BW 1.0 kHz
#VBW 3.0 kHz
Span 2.000 MHz
Sweep 1.911 s (1001 pts)

Emission Mask II

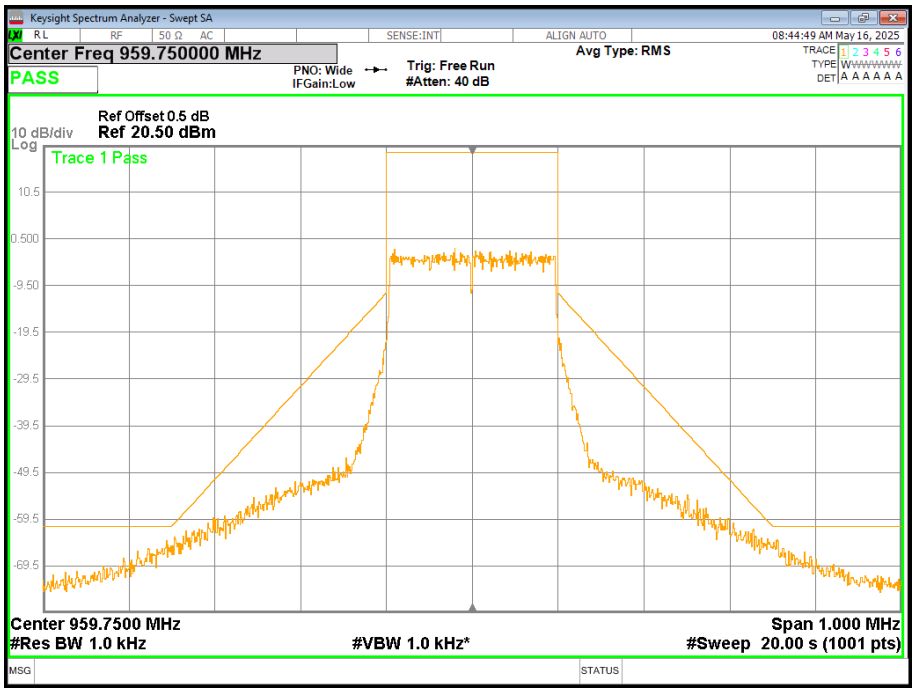
Mode 1



Mode 2



Mode 3

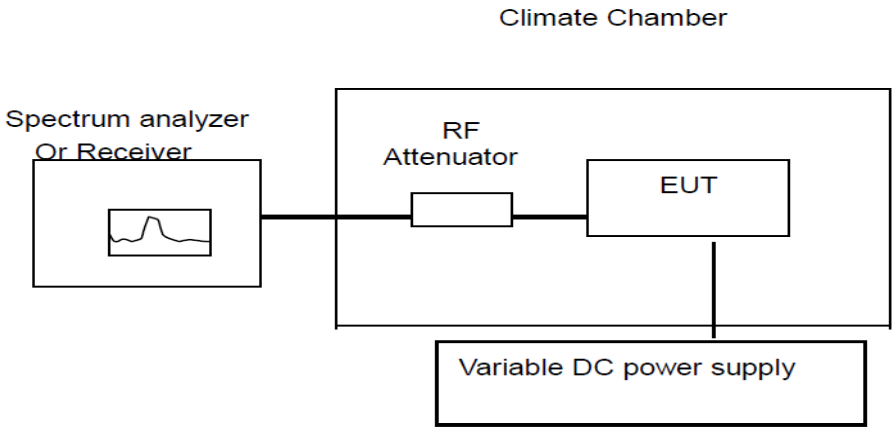

Keysight Spectrum Analyzer - Swept SA
Center Freq 959.750000 MHz
PASS
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: RMS
08:44:49 AM May 16, 2025
Ref Offset 0.5 dB
10 dB/div
Ref 20.50 dBm
Log
Trace 1 Pass
10.5
0.500
-9.50
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Center 959.7500 MHz
Span 1.000 MHz
#Res BW 1.0 kHz
#VBW 1.0 kHz*
#Sweep 20.00 s (1001 pts)

4.5 FREQUENCY STABILITY VS. TEMPERATURE & VOLTAGE

4.5.1 TEST LIMIT

According to CFR 47 section 74.861 e (4), the frequency tolerance of the transmitter shall be 0.005 percent.

4.5.2 TEST CONFIGURATION



4.5.3 TEST PROCEDURE

a The EUT was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. The DC leads and the RF output cable, exited the chamber through an opening made for that purpose.
After the temperature stabilized the frequency output was recorded form the counter.
An external variable DC power supply was connected to the battery terminals of the equipment under test.

b. For hand carried, battery powered equipment primary supply voltage was reduced to the battery operating end point as specified by the manufacturer. The output frequency was recorded for each battery voltage.

4.5.4 TEST RESULTS

(1) Frequency stability versus input voltage (Supply Nominal voltage is DC 3.7V)

(2) Frequency stability versus input voltage (Supply battery operating end point which shall be specified by the manufacturer DC 4.07V)

956.45MHz - 959.85MHz

Environment		Frequency Deviation measured with time Elapse(30 minutes)					
Temperature (ºc)	Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Results
50	Normal Voltage	956.5500	956.5498	-200	0.0000	0.0050	PASS
40		956.5500	956.5491	-900	-0.0001		
30		956.5500	956.5496	-400	0.0000		
20		956.5500	956.5513	1300	0.0001		
10		956.5500	956.5517	1700	0.0002		
0		956.5500	956.5502	200	0.0000		
-10		956.5500	956.5521	2100	0.0002		
-20		956.5500	956.5475	-2500	-0.0003		
-30		956.5500	956.5515	1500	0.0002		
20	Maximum Voltage	956.5500	956.5482	-1800	-0.0002		
-30	BEP	956.5500	956.5532	3200	0.0003		

Environment		Frequency Deviation measured with time Elapse(30 minutes)					
Temperature (ºc)	Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Results
50	Normal Voltage	958.1500	958.1466	-3400	-0.0004	0.0050	PASS
40		958.1500	958.1470	-3000	-0.0003		
30		958.1500	958.1492	-800	-0.0001		
20		958.1500	958.1510	1000	0.0001		
10		958.1500	958.1529	2900	0.0003		
0		958.1500	958.1486	-1400	-0.0001		
-10		958.1500	958.1493	-700	-0.0001		
-20		958.1500	958.1502	200	0.0000		
-30		958.1500	958.1495	-500	-0.0001		
20	Maximum Voltage	958.1500	958.1505	500	0.0001		
-30	BEP	958.1500	958.1500	0	0.0000		

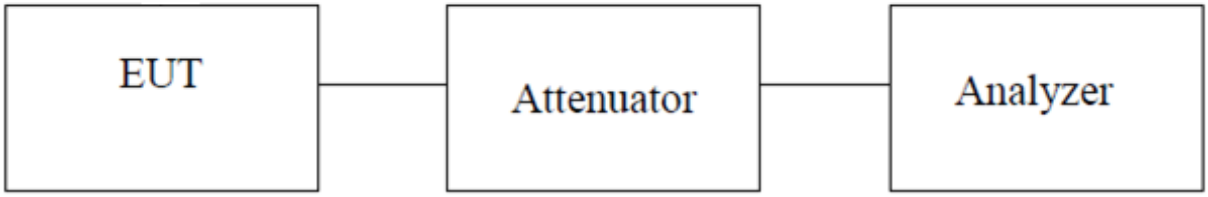
Environment		Frequency Deviation measured with time Elapse(30 minutes)					
Temperature (ºc)	Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Results
50	Normal Voltage	959.7500	959.7520	2000	0.0002	0.0050	PASS
40		959.7500	959.7506	600	0.0001		
30		959.7500	959.7505	500	0.0001		
20		959.7500	959.7505	500	0.0001		
10		959.7500	959.7520	2000	0.0002		
0		959.7500	959.7508	800	0.0001		
-10		959.7500	959.7511	1100	0.0001		
-20		959.7500	959.7504	400	0.0000		
-30		959.7500	959.7530	3000	0.0003		
20	Maximum Voltage	959.7500	959.7493	-700	-0.0001		
-30	BEP	959.7500	959.7478	-2200	-0.0002		

4.6 OCCUPIED BANDWIDTH

4.6.1 TEST LIMIT

According to CFR 47 section 74.861 e (5), the operating bandwidth shall no exceed 200 KHz. Near the carrier an emission mask is defined by the standard.

TEST CONFIGURATION

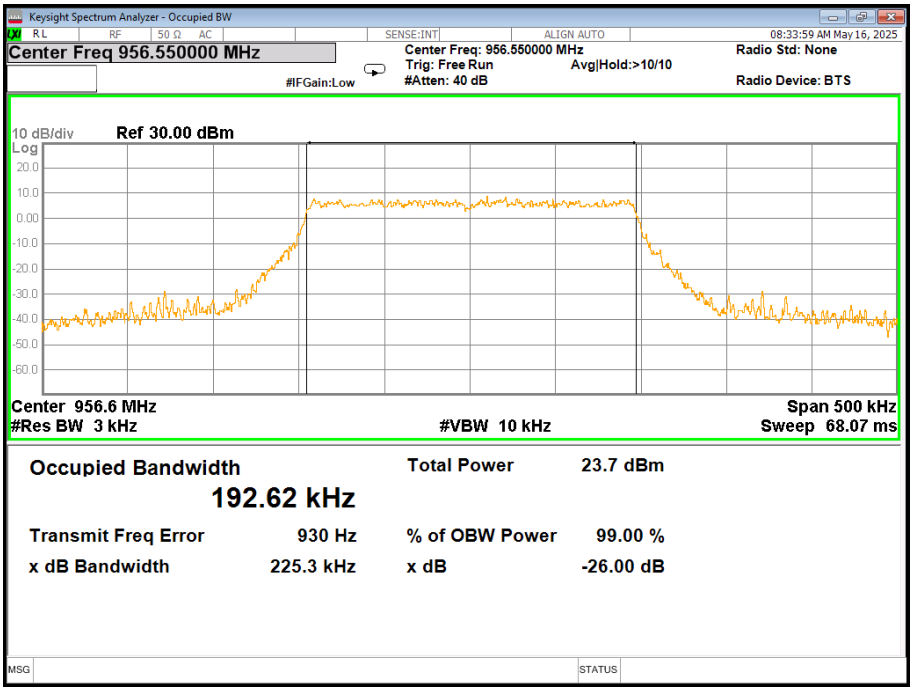


4.6.2 TEST PROCEDURE

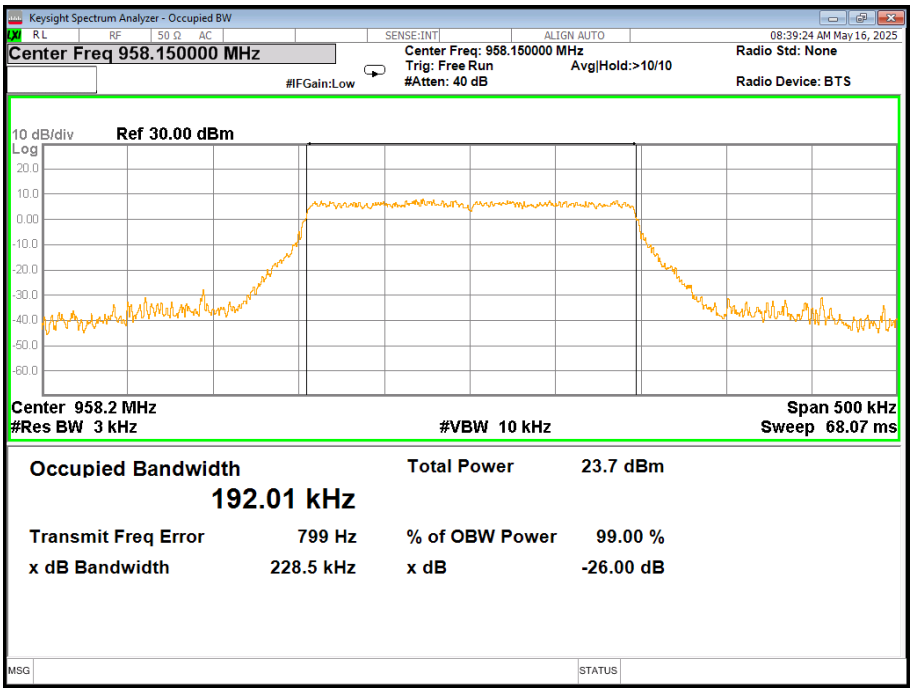
a. The RF output of the transceiver was connected to the input of the spectrum analyzer through sufficient attenuation.
   Set Occupied Bandwidth was measured with a occupied bandwidth function of the analyzer.
b. The near the carrier emissions are measured by normal power measurement function of the analyzer.
c. Set SPA Max hold. Mark peak, 99%.

4.6.3 TEST RESULT

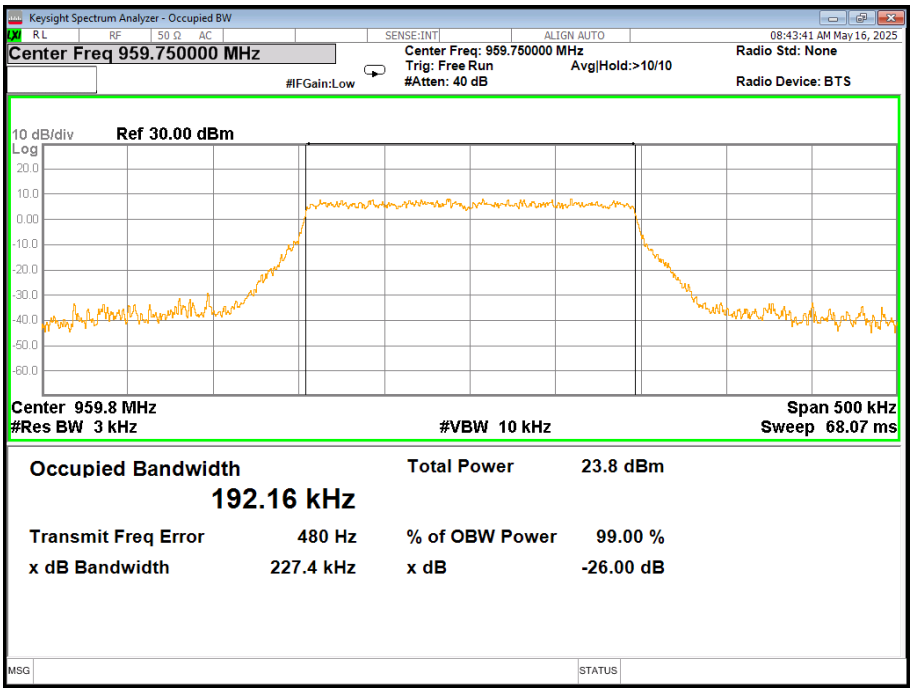
Mode 1



Mode 2



Mode 3


Keysight Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
08:43:41 AM May 16, 2025
Center Freq 959.750000 MHz
#IFGain:Low
Center Freq: 959.750000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
10 dB/div
Ref 30.00 dBm
Log
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
Center 959.8 MHz
#Res BW 3 kHz
#VBW 10 kHz
Span 500 kHz
Sweep 68.07 ms
Occupied Bandwidth
192.16 kHz
Total Power 23.8 dBm
Transmit Freq Error 480 Hz
% of OBW Power 99.00 %
x dB Bandwidth 227.4 kHz
x dB -26.00 dB
MSG
STATUS

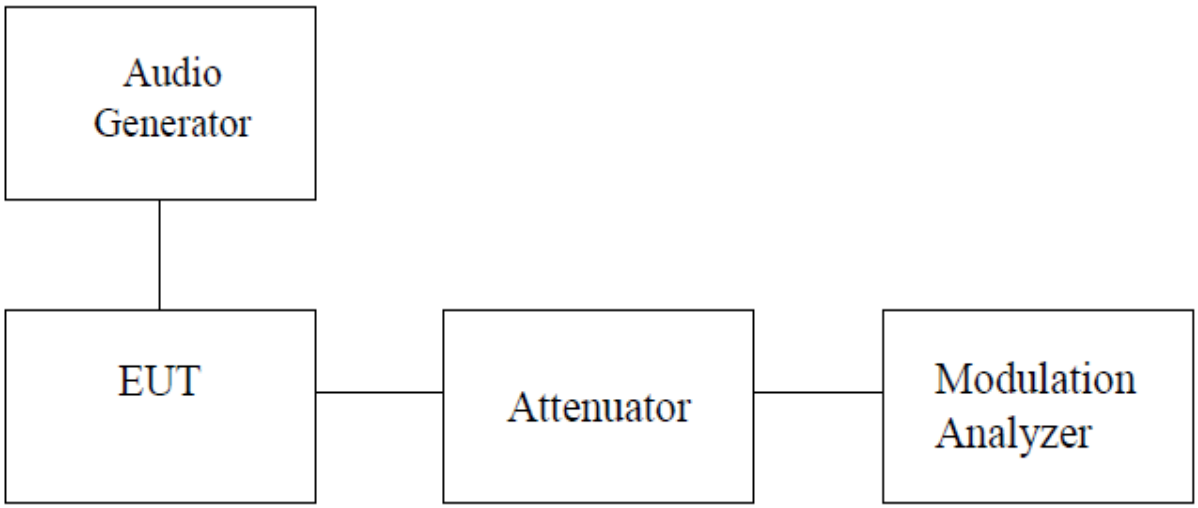
4.7 AUDIO FREQUENCY RESPONSE

4.7.1 TEST LIMIT

The audio frequency response is the degree of closeness to which the frequency deviation of the transmitter follows a prescribed characteristic.The frequency response of the audio modulation part is measured over a frequency range of 100 Hz to 5000 Hz.

According to CFR 47 section 74.861 e (1), any form of modulation may be used. A maximum deviation of ±75 KHz is permitted when frequency modulation is employed.

4.7.2 TEST CONFIGURATION



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4.7.3 TEST PROCEDURE

a. The audio frequency response is the degree of the closeness to which the frequency deviation of the transmitter follows prescribed characteristics.

b. The frequency response of the audio modulation part is measured over a frequency range of 100Hz to 5000 Hz.

c. For 1000 Hz tone reference signal the audio generator level is adjusted to get 20% of the rated system deviation.

d. The deviations obtained over the frequency range from 100 HZ to 5000 Hz are recorded and compared with the reference deviation as follows:
Audio Frequency Response= 20 log (DEV freq/ Dev ref)

4.7.4 TEST RESULT

Note: The EUT is digital modulation, not applicable.

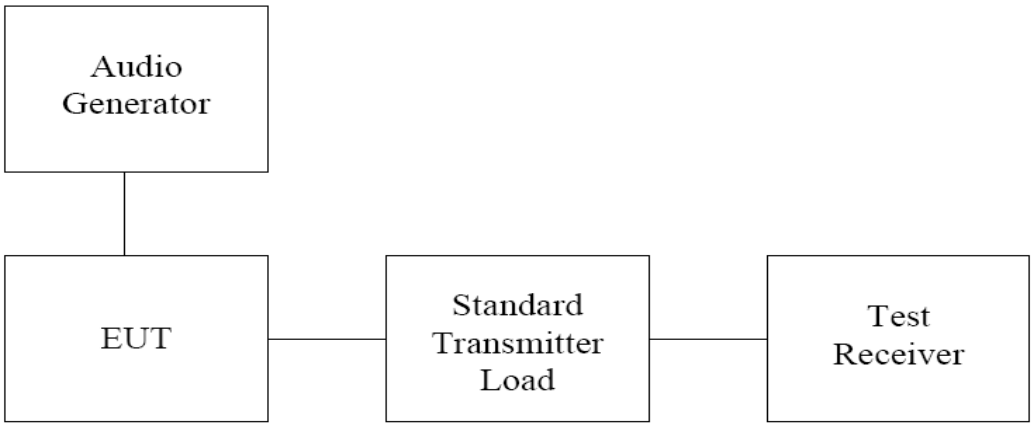
4.8 MODULATION DEVIATION

4.8.1 TEST LIMIT

According to CFR 47 section 2.1047 a, for Voice modulation communication equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000 Hz shall be measured.

According to CFR 47 section 74.861 e (3), any form of modulation may be used. A maximum deviation of ±75 KHz is permitted when frequency modulation is employed.

4.8.2 TEST CONFIGURATION



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4.8.3 TEST PROCEDURE

a. Modulation limits is the transmitter circuit's ability to limit the transmitter form producing deviations in excess of rated system deviation.

b. The audio signal generator is connected to the audio input of the EUT with its full rating.

c. The modulation response is measured at certain modulation frequencies, related to 1000 Hz reference signal.

d. Tests are performed for positive and negative modulation.

4.8.4 TEST RESULT

Note: The EUT is digital modulation, not applicable.

4.9 RF OUTPUT POWER

4.9.1 TEST LIMIT

According to CFR 47 section 74.861 e (1), the power of the measured unmodulated carrier power at the output of the transmitter power amplifier (antenna input power) may not exceed the following:

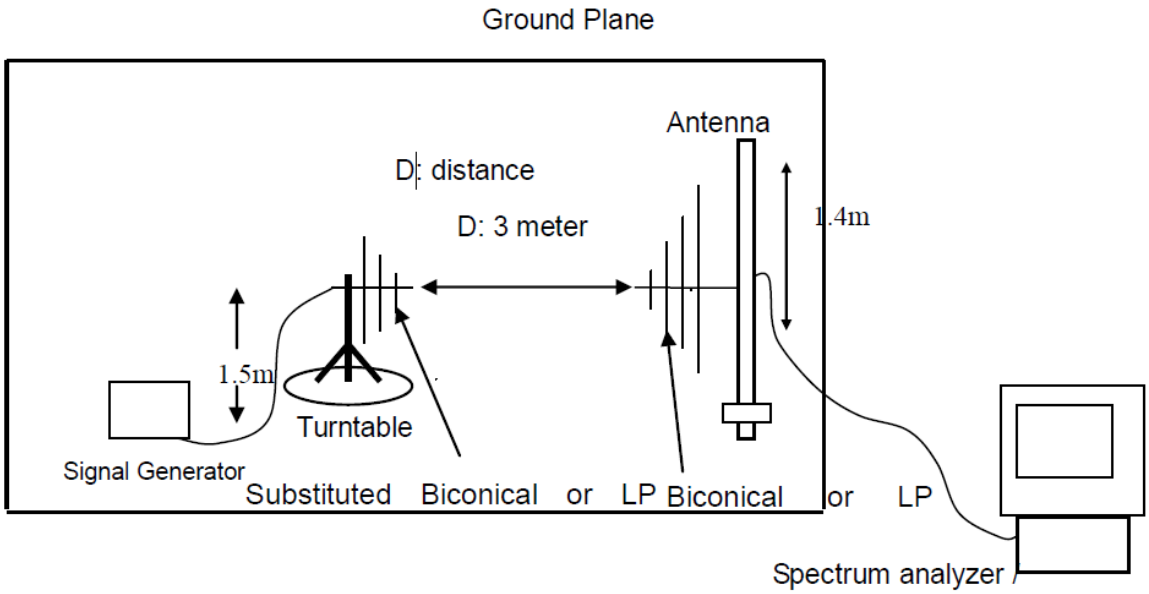
(i) 54-72, 76-88, and 174-216 MHz bands: 50 mW EIRP

(ii) 470-608 and 614-698: 250 mW conducted power

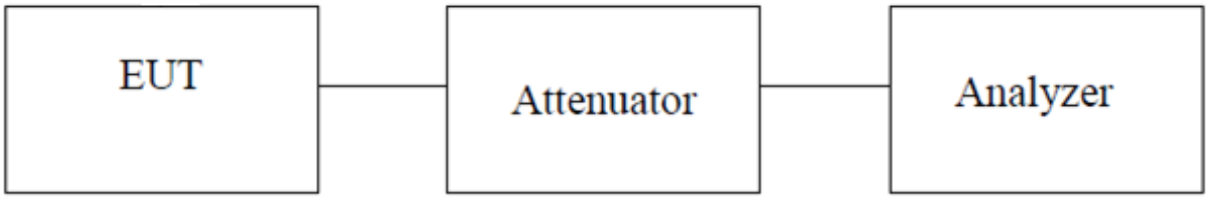
(iii) 600 MHz duplex gap: 20 mW EIRP

4.9.2 TEST CONFIGURATION

Radiation



Conduction



4.9.3 TEST PROCEDURE(Radiation)

a. On a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.
b. The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
c. The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
d. The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
e. The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
f. The transmitter shall than be rotated through 360°in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
g The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.

h The maximum signal level detected by the measuring receiver shall be noted.

i The measurement shall be repeated with the test antenna set to horizontal polarization.

j Replace the antenna with a proper Antenna (substitution antenna).

k The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.

l The substitution antenna shall be connected to a calibrated signal generator.

m If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

n The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.

o The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.

p The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.

q The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

TEST PROCEDURE (Conduction)

a. The RF output of the transceiver was connected to the input of the spectrum analyzer through sufficient attenuation.

b. Set the RBW >20BW,VBW>3xRBW.

c. Detector = peak.

d Sweep time = auto couple.

e Trace mode = max hold.

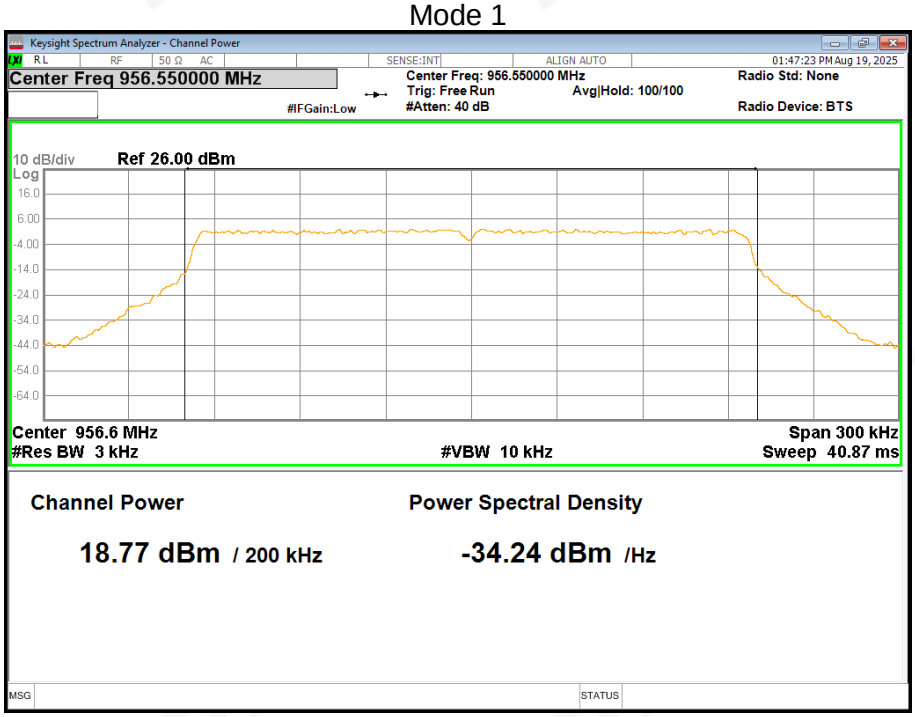
f Allow trace to fully stabilize.

g Use the peak marker function to determine the maximum amplitude level.

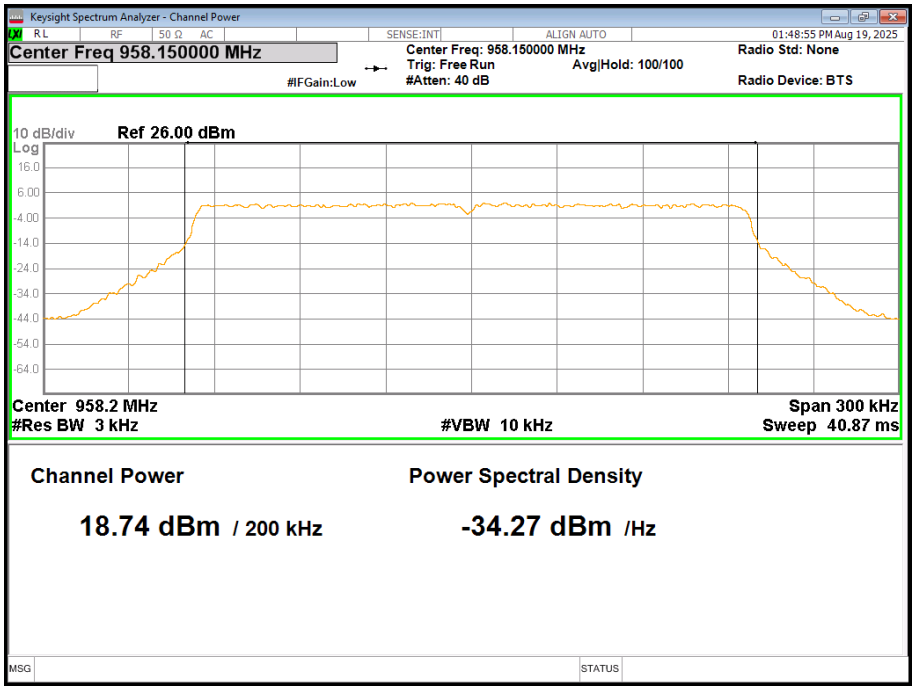
4.9.4 TEST RESULT

Frequency Channel (MHz)	Conducted Output Power (dBm)	Ant Gain (dBd)	EIRP (dBm)	EIRP (mW)	Limits (mW)
956.550	18.77	2.11	20.88	122.462	1000
958.150	18.74	2.11	20.85	121.619	1000
959.750	18.73	2.11	20.84	121.339	1000

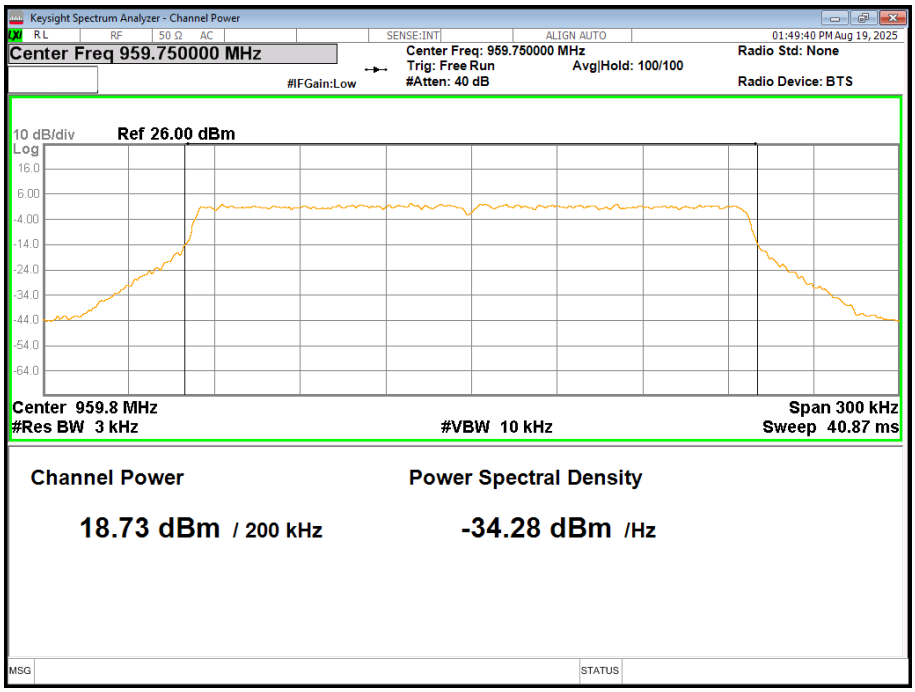
Mode 1



Mode 2


Keysight Spectrum Analyzer - Channel Power
RL RF 50 Ω AC SENSE:INT ALIGN AUTO 01:48:55 PM Aug 19, 2025
Center Freq 958.150000 MHz
Center Freq: 958.150000 MHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 40 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10 dB/div Ref 26.00 dBm
Log
16.0
6.00
-4.00
-14.0
-24.0
-34.0
-44.0
-54.0
-64.0
Center 958.2 MHz
#Res BW 3 kHz
#VBW 10 kHz
Span 300 kHz
Sweep 40.87 ms
Channel Power
18.74 dBm / 200 kHz
Power Spectral Density
-34.27 dBm /Hz
MSG
STATUS

Mode 3


Keysight Spectrum Analyzer - Channel Power
RL RF 50 Ω AC SENSE:INT ALIGN AUTO 01:49:40 PM Aug 19, 2025
Center Freq 959.750000 MHz
Center Freq: 959.750000 MHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 40 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10 dB/div Ref 26.00 dBm
Log
16.0
6.00
-4.00
-14.0
-24.0
-34.0
-44.0
-54.0
-64.0
Center 959.8 MHz
#Res BW 3 kHz
#VBW 10 kHz
Span 300 kHz
Sweep 40.87 ms
Channel Power
18.73 dBm / 200 kHz
Power Spectral Density
-34.28 dBm /Hz
MSG
STATUS

PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※